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EZEKIEL HERBERT SARGENT.

Born at Dover, N. H., November 13, 1830. Died at Chicago, Ill., April 24, 1904.
President of the American Pharmaceutical Association, 1869-1870.

PROCEEDINGS
OF THE
AMERICAN
PHARMACEUTICAL ASSOCIATION
AT THE
FIFTY-SECOND ANNUAL MEETING
HELD AT
KANSAS CITY, MO., SEPTEMBER, 1904.
ALSO THE
ROLL OF MEMBERS.

BALTIMORE:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1904.



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MINUTES

OF THE

FIFTY-SECOND ANNUAL MEETING.

THE Fifty-Second Annual Meeting of the American Pharmaceutical Association was held at Kansas City, Mo., during the week of September 5-10, 1904, with headquarters at the Coates House, Tenth and Broadway. Kansas City fairly redeemed herself from the reputation she had borne with the Association since the meeting there in 1881 of being an insufferably hot place in summer, for the weather was almost perfection throughout the meeting and contributed greatly to the enjoyment of the occasion. The attendance was good, and the number of new members, some 230, encouraging. Altogether, the meeting was a decided success.

FIRST SESSION—MONDAY AFTERNOON, SEPTEMBER 5, 1904.

The first general session was held in the "New Casino," on Broadway, near the hotel headquarters, and was called to order at 3:30 p. m. by President Lewis C. Hopp, of Cleveland.

The President announced that Mr. H. V. Riddell, as the representative of the Kansas City Retail Druggists' Association, would welcome the Association on behalf of his organization, and Mr. Riddell came forward and delivered an address of welcome in terms of hearty cordiality and good will.

Hon. James H. Neff, Mayor of Kansas City, was introduced by the retiring speaker, and welcomed the Association on behalf of the municipality and the people of Kansas City.

The President designated Mr. Henry P. Hynson, of Baltimore, to respond to the kind words of welcome delivered by the Mayor, and Mr. Hynson acquitted himself of the task assigned him with credit, as is his custom. Mr. Joseph L. Lemberger, of Lebanon, Penna., was designated to respond to the address of Mr. Riddell, representing the Kansas City Retail Druggists' Association, and he did so in a few well-chosen words.

The President asked if there were any delegates present from the National Wholesale Druggists' Association or National Association of Retail Druggists, but there was no response. The chair explained that Mr. Faxon, of the first-named organization, was to speak at this time, but could not be present at this session and the matter would be deferred until to-morrow.

Mr. Riddell asked leave to announce that the Missouri & Kansas Telephone Company begged to tender the use of its long-distance service throughout the country to members of the Association during the meeting, and said the Home Telephone Company desired to extend the same courtesy as to its city service. General Secretary Caspari then read a letter which had been received by the President making the same character of proffer on behalf of the Bell Telephone Company of Missouri. On motion of Mr. John F. Hancock, seconded by Mr. O. F. Claus, the hearty thanks of the Association were tendered the telephone companies for their very liberal offer.

Second Vice-President A. M. Roehrig was called to the chair while the President delivered his Annual Address :

Fellow Members, Ladies and Gentlemen :

Twenty-three years ago the Association met in this beautiful, hustling city of the Southwest. Although a member, I did not attend the meeting. My partner in business was present, and from the account he gave I have always thought that none of those who were members at that time would ever want to attend another meeting in the Southwest, all on account of the heat. They had a good meeting, one of profit to all, but the heat! the heat! Now, gentlemen, we have had meetings in other sections when the heat was intense, and where I believe eggs would have been hard boiled if left out in the sun, but what of the heat? The American Pharmaceutical Association has a mission to fulfill, and such a small obstacle as heat must be overlooked. Our mission is to disseminate pharmaceutical knowledge over the broad expanse of this country, and this year particularly in the southwestern territory of the United States. We cannot depend entirely on our Annual Report, or the Pharmaceutical Journals; although of great assistance and a power, they become as all other things, commonplace, and are treated with indifference, for variety is the spice of life, and a change is desired. The pharmacists want to see, and come in touch with us—they want to see what we look like and how we do business—such being the case, we must go to the various sections, even if they be a little remote. This, I am pleased to say, cannot be said of Kansas City, as it is to-day right in our midst. We must mingle with the pharmacists, welcome them to our organization, give them the glad and hearty hand-shake, and make them feel that the American Pharmaceutical Association welcomes them, yes, thrice welcomes them, to the grand organization we represent. I hope that every one present will prove to the Kansas City people, and to those living in territory surrounding, that we are glad we came here, and when we leave, it will be with a feeling of regret, and that you do not wait twenty-three years before asking us to come again.

According to the By-Laws, Chapter I, Article IX., the President shall present at each annual meeting an address embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion. The address of the Chairman of the Scientific Section is so replete with scientific facts and events which are considered by said Section, that I beg leave not only to deviate from

the generally accepted rule and confine my address to the general welfare of the Association, but also call attention to this Article of the By-Laws, which must have been overlooked at the time of the reorganization in 1887, at which time the Association was divided into Sections for the express purpose of considering subjects relating to the various branches of pharmacy, and therefore I recommend that the words "Embodying general scientific facts and events of the year" be stricken out of Article IX., Chapter 1.

Pharmacopoeial questions will be ably taken care of by the Committee on Revision of the U. S. Pharmacopoeia. In a recent letter received from Prof. Remington, he informed me that he will have over one-half of the new Pharmacopoeia in type at the time of this meeting. This, no doubt, is gratifying to us all, but particularly must it be so to the members of the Revision Committee. Little can we who are not members of this committee appreciate the perplexities that have been overcome by the committee in the preparation of our authoritative standard; for this labor of love the pharmacists of this country should be truly grateful. All matters relating to commercial pharmacy I will leave to the Section on Commercial Interests, as likewise Pharmaceutical Education and Legislation.

The Committee on proposed National Bureau of Medicine and Food will no doubt present an interesting report. After it has been received, would it not be advisable to refer such part as is of vital interest to retailers to the Section on Commercial Interests, and after careful consideration by said Section, its action to be referred to the Association for final adoption or rejection? Likewise all matters pertaining to legislation to be referred to Section on Education and Legislation. I think this will expedite business considerably, as only subjects relating to various branches should be considered by the Section interested. The Bureau of Medicine and Food should receive most careful consideration, that no hasty action be taken by the Association; it is far better to consider this subject for three or four years and have every provision thoroughly understood than a hasty adoption to be followed by regret.

The question of membership in the American Pharmaceutical Association, to be offered as prizes by Colleges of Pharmacy, which was proposed two years ago and last year referred to the Committee on Membership to report a carefully-prepared and well-digested plan at this meeting, will, I hope, be definitely settled, for I firmly believe we are delaying the acquisition of desirable members to our Association.

The Section on Education and Legislation and the Committee on National Legislation will no doubt present extended reports on legislative matters presented to the House of Congress and State Legislatures. These should receive the careful consideration of the Association, as the endorsement of the American Pharmaceutical Association on any bill presented to Congress carries considerable weight. All members of the Legislature, be they National or State, regard endorsements coming from our Association with more than ordinary interest. Our Association is looked upon as an organization that is interested in the general welfare of our country as regards all things connected with drugs and medicines. They recognize that our Association is the voluntary coming together of the leading men interested in pharmacy in this country for the consideration of questions that are of vital interest to the nation. We no doubt will learn all about important legislation adopted by the different States this past winter. I must make mention of one—I cannot lose the opportunity I have of being the first, like the small boy who has something to tell and wants to be first—I refer to that excellent piece of pharmacy law legislation enacted in New York State this last winter, requiring all candidates for registration in New York to be graduates in pharmacy. This is a step in the right direction, and should be followed by other States (the quicker the better for advanced pharmacy). This, with the perfection of a plan for the universal interchange of certificates between States by the conference of the Boards of Pharmacy, I am sure will please all pharmacists who are interested in advanced pharmacy.

I have a few suggestions to make which I believe will be of benefit to the Association, and for which I ask your kind consideration.

FINANCE.

Invariably each year the question regarding our finances is brought up, and, after much talk, and the Treasurer explaining the handling of the funds, matters go on again in the same routine for the year, only to be brought up again at our next meeting.

Great credit is due our efficient Treasurer, Mr. Sheppard, for the excellent manner in which he handles the finances; also to our financial committee.

The expenditures of the Association as per vouchers signed by me as President amount to considerably more than we receive from our annual dues.

The annual dues are the only ones from which the actual working expenses of the Association should be paid as it is the only source of revenue that we can depend upon. We are fortunate at times to have funds donated to us, but such donations are few and far between and should never be depended upon; we must always keep in mind that the annual dues for each year is our annual income, and we must keep our expenses within the amount received. With this in view I recommend the creating of a fund to be known as the General Expense Fund, said fund to receive each year 90 per cent. of all moneys received for annual fees. The remaining 10 per cent. and all other moneys received each year from other sources than annual dues shall be placed in a separate fund to be known as Section Committee Fund, and if occasion should arise it can be drawn on to meet the general expense, and then only on condition of its being loaned to the General Expense Fund, and for the use of which a legal rate of interest shall be charged.

The general expense should include the following: printing, publishing and the distribution of annual reports, salaries, traveling expenses, stenographer and insurance premium on Treasurer's bond. No moneys to be paid out of the General Expense Fund for any other purpose.

The General Expense Account of any one year should be arranged on the basis of what the income from dues was the year previous. If the income runs short it will be necessary for the Finance Committee to retrench expense account so as to come within the 90 per cent. limit. If a surplus remains at the end of a year the surplus shall remain in the General Expense Fund, or a part of it may be transferred *only* to Section Committee Fund.

All moneys donated to the Association without specification being made for its use shall be put in the Section Committee Fund, this with the 10 per cent. received from annual dues should not be used for any other purpose than for Sections, Committees and Prizes. If the fund at any time is not large enough, the Sections, Committees and Prizes must either wait until sufficient money is in the fund or agree on proportionate amount for each.

For the next two years it may be necessary to reduce General Expense Account \$500 or \$600 per year, and cut out prizes from Section Committee Account. This, however, will depend largely on the accession to our membership; if the income is what it should be there will be no necessity for retrenchment.

The creating of two funds I am satisfied will simplify matters greatly, particularly so when motions are made for moneys for use of committees. There will be no necessity for the chasing after the Treasurer to find out how our finances are, as the Treasurer in his report will state the amount of money in the Section Committee Fund, and all transactions must be governed accordingly.

PUBLICITY.

Has it ever occurred to you that our Association receives less publicity than organiza-

tions of a similar kind in this country? How many newspapers are there that publish a notice of our annual meeting? The public no doubt takes it for granted that the druggists have an organization; how much do they know of our work and the purpose of our organization? Little do they know that our organization is largely for their benefit. Would not the publication of well-written articles in the public press so impress the public that they will demand of their druggists membership in our Association? From now on we should not let an opportunity pass to enlighten the public. I therefore recommend that a department or a Committee on Publicity be established. How much publicity is given our Association to the druggists of this country? Very little, indeed; rarely is more than three months of the year given to the American Pharmaceutical Association and that as follows: the month previous to the meeting, the month of the meeting, and the month following—after that for nine months silence, the Association being almost out of existence. This lack of publicity no doubt has a great deal to do with our having so small a membership.

The thanks of the Association are due to the journals of this country and their editors for what they are doing and have done for our benefit. We cannot expect the editors of these papers to give us their entire time, as they have so many other interests requiring their attention.

My idea of the work to be performed by this department is

1. The preparation and writing of articles relating to the American Pharmaceutical Association at least once a month for publication in the journals.

2. The publication of a monthly news bulletin, not a journal, to be devoted exclusively to American Pharmaceutical Association news, to be mailed regularly each month to members, and non-members who may become interested, charging a small fee. It can be made most valuable in setting forth the merits of the National Formulary and especially keeping before the pharmacists matters of importance that are presented at our meetings, which are now seemingly forgotten two months after meeting adjourns. The publishing of this bulletin will probably entail considerable expense, yet I think we have enough members in our Association who will gladly contribute towards its publication to give it a trial, and I am sure after we have once started with the bulletin we will see the value of it and make it self-sustaining.

3. The Annual Announcement that is published and sent now only to members, I recommend be enlarged to a pamphlet, of say ten pages of reading matter, containing all that is now in the circular, with the following additions:

Setting forth the objects of the Association.

Strong appeal to join us in membership.

Invitation direct from the Association to attend its meetings.

Application blank. Description of the meeting place and such other matters as may be of interest. This pamphlet to be sent to all druggists who are members of State Pharmaceutical Associations, "A Preferred List of Druggists." Now that we have a direct appeal from the Association to the pharmacists to join us in membership, also an invitation to attend the meeting direct from us and not through a second party as is the course now via the journals, our membership ought to be largely increased. The receipt of such a pamphlet by a pharmacist for a period of two or three years cannot help but awaken an interest. Two-thirds of the members we have I am satisfied were gotten by personal solicitation. The sending out of this pamphlet means that we must have about 20,000 printed, and of course with the mailing the cost will be considerable, and to defray the expenses it will be necessary to solicit advertisers. It will be a most desirable advertising medium. Some of you may hold up your hands in holy horror and say all kinds of things, but, gentlemen, this is business, and to obtain business you must do business as it is done to-day. It is a recognized fact that a large membership is prerequisite to the making of a prosperous organization, and there is but one way to get

members; but few will come to us, we must go after them. Our Membership Committee, through Mr. Mittelbach, Chairman, has done valiant service, yet I am free to say that had our Association received the publicity it deserves, we would have nearer 5,000 members than the small number we now have.

In this connection, is there not a possibility of interesting the Pharmacists of Canada to such an extent that in the near future they organize a section of the A. Ph. A. in their country, and thereby come in closer affiliation with us? It seems almost incredible that only 20 out of 1,700 pharmacists in Canada are members of the A. Ph. A. Yet such is the fact. So small a representation in our Association, the foremost Pharmaceutical Association in America, surely cannot be due to their lack of interest in the association work, for Canadians are very much inclined to sociability. Is it because our meetings are held at so great a distance from points in Canada, making long trips necessary? Yes, this is true to some extent, but it is largely due to the lack of publicity; and such being the case, the establishment of an American Pharmaceutical Association Section in Canada will be wise and no doubt profitable to us both. I, therefore, suggest that when you consider the report of the Committee on Local Branches of the A. Ph. A., you will also consider Section for Canada, Cuba, Porto Rico, the Philippines and Hawaii.

THE PROCTER MEMORIAL FUND.

Now that a stated amount has been decided on for this fund, is it not our duty to make an extraordinary effort to complete the fund in as short a time as possible? Is it not also true that we desire to keep the memory of William Procter, Jr., constantly before the pharmacists, and particularly the younger pharmacists, that they may be guided by the life of such a devotee of pharmacy? Can there be a more fitting or laudable way of honoring the memory of beloved William Procter, Jr., than the issuing of a richly engraved certificate of membership embellished with the portrait of the first ideal pharmacist the country had, the founder of our Association? I am sure that such a certificate will appeal to all of our present members, and it should be made obligatory hereafter for all new members to procure a certificate. I would also advise the appointing of a committee to solicit subscriptions amounting to the sum of \$5 from each member of our Association, each one so contributing to receive a certificate of membership. All moneys received from the sale of certificates to be placed in this fund, after having deducted all costs. There is no doubt but that a large number of pharmacists, members and non-members of State Pharmaceutical Associations, would like an opportunity to contribute to this laudable undertaking, and I would advise that the Committee on Procter Fund be instructed to secure the appointing of a committee from each State Pharmaceutical Association for the purpose of soliciting funds, and to bring about a friendly rivalry between states, each state to be credited by having the amount donated published in our Annual Report. The carrying out of these provisions I am sure will secure the entire amount of \$25,000 in a very few years.

THE COMMITTEE ON HISTORICAL PHARMACY.

The maiden report of this Committee presented at its first session a year ago at once came into general favor with those who were fortunate enough to be present. The stay-at-homes, if they have read the report and are at all interested, cannot but be impressed with its value to pharmacy, and to the American Pharmaceutical Association. Much credit is due Mr. Edward Kremers, the Chairman, who has proved to be the right man in the right place, and to his efficient Secretary, Mr. E. J. Kennedy.

Historical Pharmacy should be placed on a more permanent basis, and I recommend that the Association at this meeting establish a Section on Historical Pharmacy, with Mr. Kremers as permanent Chairman; I suggest permanent Chairman for the reason that I do not deem it wise that the chairmanship be changed each year, and Mr. Kremers hav-

ing made so able a beginning, we will be most fortunate in continuing him in that capacity, provided he will serve. If this is deemed inadvisable a permanent Historian might be elected to serve jointly with the regularly elected Section officers. Historical Pharmacy means much more to pharmacy than we realize at present, and let us, each and every one of us, do all we can to further the interests of this Section. No doubt many of you have asked the question, why was not this project started years ago; but it is like everything else, one good thing brings forth another. Many good things have been accomplished, and it seems as though year by year we are adding something a little better for the benefit of pharmacy. Last year proved to be one of the best. What this year will bring forth remains for you to decide. Would it not be advisable for this Section to have charge of the pharmaceutical exhibitions, making them more of an educational feature than has heretofore been done, the Section Committee to be made large enough so that it can be divided and a sub-committee on exhibits selected therefrom?

THE NATIONAL FORMULARY.

In the National Formulary we have one of the most valuable collections of formulas that has ever been published. The American Pharmaceutical Association can be justly proud of this work, and very much so on account of its being the work of its own members. I regret to acknowledge the fact that it has not the popularity it so justly deserves, even though it is gratifying to know that it is through no fault of the book, or its formulas; it is due to the lack of publicity. Would that we had some rich philanthropist to give us \$25,000 or \$50,000 for the purpose of popularizing this book and its formulas. If the Association were only so situated financially that it could afford to send out men to detail both physicians and druggists with preparations prepared according to the National Formulary, it would not be long before its popularity on a scale it deserves would be assured. I hope the Commercial Section and Section on Practical Pharmacy and Dispensing will carefully consider and devise some plan to bring about a more general use of National Formulary preparations.

I think the preparation of sets of labels for N. F. Preparations with a blank space for inserting the name of the pharmacist would be of inestimable value to the Association and its members, and incidentally net the Association some revenue, provided the design were copyrighted by the Association and the privilege to print given to some printing establishment and the price charged for same regulated by the Association. These labels I am sure would be greatly appreciated and many pharmacists would avail themselves of the opportunity, thus making National Formulary preparations more popular. The furnishing of these labels through our Association in small lots will give the retail pharmacist the opportunity to furnish his local physician with samples of preparations and to make a creditable display at the meetings of the local Medical Association. The preparing of sets of labels for samples, etc., by the retail pharmacist will entail too great an expense for him to undertake, and to present a preparation with a written label detracts from its appearance, especially when compared with similar preparations prepared by manufacturing houses, who usually adopt fanciful trade-mark names, with the result that the retail pharmacist must keep on his shelves the preparations of five or six makers, all being similar to National Formulary preparations. To popularize N. F. preparations among pharmacists, I would suggest that the Association offer a suitable prize for the best set of these preparations exhibited at our Annual Meeting; the competition to be limited to the retail pharmacists of the state in which the meeting is held.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

That young brother of ours, the National Association of Retail Druggists, is growing rapidly, doing a great deal of good, and especially awakening that latent interest in the

druggists along the line of association work, and through its publicity department it is constantly advising and urging pharmacists to join associations. That this has been of inestimable value to our Association is shown by the large number of new members added the past few years, for we have during the years 1901, 1902, 1903, added 634. The American Pharmaceutical Association should aid and assist in every way possible the National Association of Retail Druggists in its laudable work. Through our Commercial Section much valuable assistance can be given the N. A. R. D. The N. A. R. D., as you are all aware, is composed exclusively of delegates who represent local and state associations. These delegates are under instruction from the local association they represent. The Commercial Section, by the very nature of having representative men from all sections in attendance, can and should take up questions of a commercial character, thoroughly discuss them, and after careful consideration present them to the N. A. R. D. through our delegates to said association at its annual meeting. By this means questions which seem at first to be purely of a local character can after due deliberation be so moulded as to become national, and instead of benefiting only a locality can be of value to the entire country. I would recommend that our program of sessions be so arranged that the last three sessions be assigned to the retail pharmacists, the Sections of Practical Pharmacy and Dispensing and Commercial Section. These two Sections, by having definite times assigned to them for their meetings in the latter part of the week, I think will influence a great many retailers to be present and take a more active part in our deliberations. A great many may not wish to spend an entire week, which is necessary according to our present program. The Commercial Section being held on the second day, and Section on Practical Pharmacy on the fifth day, such retailers as do not wish to take part in the proceedings of the other sections must remain the entire week. The same is true of those not directly interested in the retailers' work, and the pleasant feature of this arrangement will be the time for recreation to be had by those desiring to attend either one or the other branches of our Association.

INSTALLATION OF OFFICERS.

One of the pleasantest features of our meeting is the installation of officers, an event always looked forward to with a great deal of pleasure by the officers-elect, their friends and the ladies. It is an event that all are interested in; it is like the coming in of a new year. Those of you who have been in regular attendance well know the stir and joyous feeling existing on the day of the last session, as the word is passed that the officers are to be installed this morning or afternoon. The installation comes, however, at a most inopportune time. According to our By-Laws, Art. XVI., Chapter VIII, "The newly-elected officers shall take their respective places at the last general session." The last session is usually a busy one, a sort of clearing-house meeting, everything on the rush and frequently the time of the session is taken up with business close to the time of adjournment, and as at that time many are on the anxious seat regarding time of leaving, etc., when installation time comes fully two-thirds have left the hall, and finally, just as we are about to adjourn, there is scarcely a quorum left, as was the case at the Mackinac meeting last year. To give everybody an opportunity to look their best, and particularly the newly-elected officers, I recommend that the By-Laws be amended so that a general session be held expressly for the purpose of installation of officers on the evening preceding the last day of the meeting, and immediately that is done, adjourn, and give the remainder of the evening to business of Sections or Committees, as occasion might arise.

In conclusion, gentlemen, I desire to thank you for the honor you have conferred on me by electing me your presiding officer for the past year; the Presidency of the A. Ph. A. is the highest honor that can be conferred on one in pharmacy in this country, and I assure you I appreciate it. I thank you for your kind attention, and if you will over-

look little shortcomings on my part while presiding over your deliberations, I am sure we will have a pleasant and harmonious meeting, and that the fifty-second meeting of the A. Ph. A. held in Kansas City in 1904 will always be referred to as one of the best.

The address of the President was received with marked demonstrations of approval, and Mr. Otto F. Claus, of St. Louis, moved to refer to a special committee of three, for report upon the recommendations contained therein. This motion was heartily seconded by Mr. C. S. N. Hallberg, of Chicago, who took occasion to express his appreciation of the completeness of the President's address and its exceedingly valuable suggestions. The motion was unanimously carried, and Vice-President Roehrig appointed on the committee Messrs. F. W. Meissner, of La Porte, Ind.; F. C. Godbold, of New Orleans, and Chas. A. Rapelye, of Hartford. Mr. S. A. D. Sheppard moved to instruct the committee to make report at to-morrow's session as far as possible, since there were many suggestions in the address of the President which deserved careful consideration, and there would be a larger attendance at the second general session than at the final session at the close of the week. This motion was seconded by Mr. Puckner, of Chicago, and carried.

President Hopp resumed the chair.

The report of the Committee on Credentials was called for, and Mr. Roehrig, chairman, presented the following:

REPORT OF THE COMMITTEE ON CREDENTIALS.

To the President and Members of the American Pharmaceutical Association:

The Committee on Credentials beg to report that they have examined the credentials presented by delegates of the various organizations named below and find them in proper form:

Colleges of Pharmacy—Albany, Atlanta, California, Chicago, Cleveland, Louisville, Maryland, Massachusetts, National, Philadelphia and St. Louis—11.

Schools of Pharmacy—Medico-Chirurgical College of Philadelphia; Northwestern University; Purdue University of Lafayette, Ind.; University of Iowa; University of Kansas; University of Michigan; University of Minnesota; Illinois Medical College—8.

State Pharmaceutical Associations—Arkansas, Connecticut, Florida, Georgia, Illinois, Indiana, Indian Territory, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Vermont, Virginia, Washington, Wisconsin—27.

Alumni Associations—Maryland College of Pharmacy, Philadelphia College of Pharmacy, St. Louis College of Pharmacy—3.

National Associations—American Medical Association, National Association of Retail Druggists, National Wholesale Druggists' Association, U. S. Department of Agriculture, U. S. Naval Service, U. S. Public Health and Marine Hospital Service—6.

Local Associations—Manhattan Pharmaceutical Association—1.

ALBERT M. ROHRIG, *Chairman*,
GEO. F. PAYNE,
WM. H. BURKE.

The Secretary read the list of Standing and Special Committees, as

notice to the chairmen to have their reports ready for to-morrow's session.

The President then announced that, under the rule, a motion would be in order to take a recess for five minutes, to give the representatives from the different States, Territories and Provinces present an opportunity to select two members upon the Nominating Committee. Mr. H. M. Whelpley, of St. Louis, so moved, and it was so ordered. Upon resumption, the Secretary called the roll of the States, etc., and the Nominating Committee was made up as follows :

Alabama—P. C. Candidus.	Michigan—F. G. Ryan, J. W. T. Knox.
Arizona—Harry Briley.	Mississippi—O. W. Bethca.
California—Albert Schneider.	Missouri—A. Breunert, H. M. Whelpley.
Colorado—C. M. Ford, C. E. Ward.	New Jersey—Chas. Holzbauer, W. C. Westcott.
Connecticut—C. A. Rapelye.	New York—W. C. Anderson, Geo. C. Reiman.
District of Columbia—F. C. Henry, L. F. Kebler.	North Carolina—Francis B. Hays.
Florida—Ernest Berger.	Ohio—Geo. B. Kauffman, Theo. Wetterstroem.
Georgia—Geo. F. Payne.	Oklahoma—F. B. Lillie.
Illinois—W. A. Puckner, F. S. Hereth.	Pennsylvania—Wm. McIntyre, M. I. Wilbert.
Indiana—F. H. Carter, F. W. Meissner.	Tennessee—J. T. McGill, E. A. Ruddiman.
Iowa—Jno. L. Etzal.	Texas—J. F. Dulaney, E. G. Eberle.
Kansas—F. E. Hollyday, Geo. Leis.	Vermont—Z. B. Hopkins, W. E. Terrell.
Kentucky—C. Lewis Diehl.	Wisconsin—Edward Kremers.
Louisiana—M. Bernstein, F. C. Godbold.	Province of Manitoba—A. H. Leonard.
Maryland—H. P. Hynson, Daniel Base.	
Massachusetts—S. A. D. Sheppard, Geo. M. Hoyt.	

The President appointed as the five members-at-large upon the Nominating Committee Messrs. J. F. Hancock, of Baltimore ; A. E. Ebert, of Chicago ; Geo. M. Beringer, of Camden, N. J. ; J. M. Good, of St. Louis, and A. M. Roehrig, of Stapleton, N. Y.

It was ordered, on motion of Mr. Hynson, that the committee meet in this hall immediately after the adjournment of this session.

The Chair called for the reading of the minutes of the Council as being next in order, and Secretary Whelpley, of that body, read the minutes of the second session, held at the Coates House, Kansas City, at 11 o'clock this day (Sept. 5, 1904) :

SECOND SESSION OF THE COUNCIL—SEPTEMBER 5, 1904.

The Council was convened at the Coates House, Kansas City, at 10 a. m., by Chairman Beal. The following members were present : Messrs. J. H. Beal, W. H. Burke, Charles Caspari, Jr., Otto F. Claus, C. Lewis Diehl, E. G. Eberle, Leo Eliel, C. S. N. Hallberg, Lewis C. Hopp, H. B. Mason, George F. Payne, W. A. Puckner, C. A. Rapelye, A. M. Roehrig, S. A. D. Sheppard and H. M. Whelpley. Secretary Whelpley read the following Council correspondence covering the period since the adjournment of the first session of the Council, August 8, 1903 :

Thirty new members have been elected for the year 1903, and ninety-four for 1904.

September 16, 1903. It was moved by W. L. Dewoody and seconded by H. M. Whelpley, that

WHEREAS, There appears to have been an error in both name and date of entrance of Mr. R. M. Shoemaker, the latter published for over thirty years in our proceedings, thereby barring said Shoemaker from life membership at the time he was entitled thereto. therefore,

Resolved, That the Council of the A. Ph. A. hereby expresses to said R. M. Shoemaker its sincere regret for the error of officers long since deceased, this being the only amends we can now make to Mr. Shoemaker.

Resolved. That this resolution be spread upon our records, and a copy of it sent to Mr. Shoemaker.

Motion carried.

October 12, 1903. It was moved by Leo Eliel and seconded by Otto F. Claus, that discussions by mail through the officers of the Council be strictly limited to pending motions. Motion carried.

November 6, 1903. In view of the increased expense for the Committee on Membership authorized by the Association, it was moved by Charles Caspari, Jr., and seconded by S. A. D. Sheppard, that an additional one hundred dollars be appropriated for the use of the committee. Motion carried.

November 13, 1903. It was moved by S. A. D. Sheppard and seconded by Charles Caspari, Jr.,

WHEREAS, Mr. F. W. R. Perry, Local Secretary for the Mackinac meeting and Chairman of the Committee of Arrangements, had a unique work to attend to, inasmuch as there were no druggists in the locality to contribute funds toward entertainment; and

Whereas, Mr. Perry, notwithstanding this handicap so unusual in the history of the Association, did all his work so actively and so well as to be able to turn over into the Association treasury a donation of \$40.60, with the report of his work as Local Secretary; therefore,

Resolved, That it is the sense of the Council that Mr. Perry's report be accepted and referred for publication.

Resolved, That the hearty thanks of the Council be, and hereby are, tendered to Mr. Perry for his faithful and efficient services.

Resolved, That a copy of these resolutions be forwarded to Mr. Perry by the Secretary of the Council.

Motion carried.

December 5, 1903. It was moved by S. A. D. Sheppard and seconded by W. L. Dewoody, that Lemuel A. Ridgway, of Boone, Ia., be made a life member, old style, without the Proceedings. Motion carried.

The stock of gold badges having been exhausted and demand for the same continuing, to some extent at least, it was moved by Charles Caspari, Jr., seconded by H. M. Whelpley, that the General Secretary be authorized to have thirty-five gold badges made, and that the sum of seventy dollars be appropriated for said purpose. Motion carried.

January 14, 1904. It was moved by Otto F. Claus and seconded by H. M. Whelpley, that the General Secretary be requested to inform the pharmaceutical journals of the delay in the publication of the Proceedings, due to the illness of the Reporter on Progress of Pharmacy, and state that the volume will probably be ready for delivery early in April. Motion carried.

February 13, 1904. It was moved by Otto F. Claus and seconded by Charles Caspari, Jr., that an appropriation of \$20.00 be allowed for the expenses of the Section of Practical Pharmacy and Dispensing (the appropriation for the section has been practically absorbed by the payment of bills from last year). Motion carried.

May 21, 1904. It was moved by Chas. A. Rapelve and seconded by Clement B. Lowe, that the presentation of the financial budget for the coming fiscal year be deferred until the next meeting of the Council at Kansas City. Motion carried.

May 28, 1904. It was moved by S. A. D. Sheppard, seconded by Charles Caspari, Jr., that the sum of twenty dollars and twenty cents be appropriated for the use of the Finance Committee, for the purpose of paying the traveling expenses of said committee made necessary by a special meeting at Atlantic City, N. J., on April 26, 1904. Motion carried.

June 6, 1904. It was moved by Charles Caspari, Jr., and seconded by S. A. D. Sheppard, that an additional sum of three hundred and twenty-five dollars be appropriated for the Proceedings of 1903, the cost of publication and delivery exceeding the original appropriation made, which was three thousand dollars.

The above appropriation becomes necessary by reason of the large number of new members, and consequent larger shipments of books, which fact was not known when the appropriation for the Proceedings was made last June. Motion carried.

June 9, 1904. The proposed program for the 1904 meeting was submitted, and by vote aopted.

August 1, 1904. Inasmuch as the Finance Committee has not yet presented a budget of appropriations for the present fiscal year, and certain expenditures are unavoidable between now and the meeting of the Council in September, it was moved by Charles Caspari, Jr., and seconded by H. M. Whelpley, that the sum of three hundred dollars be appropriated for payment of such bills as may be approved by the Finance Committee, and that the Treasurer be requested to charge such bills paid to the several accounts designated on the orders for payment, and subtract the accounts from the appropriations to be hereafter made. Motion carried.

It was moved by H. M. Whelpley and seconded by Charles Caspari, Jr., that the General Secretary be instructed to have forty gold bars made for the meeting to be held at Kansas City, Mo., September 5-10, 1904. Motion carried.

August 8, 1904. An amendment to the program was offered, and on vote lost.

The Secretary of the Council has issued twenty-seven letters containing thirty-six pages, and submitted forty motions for vote by the Council.

On motion by Charles Caspari, Jr., seconded by W. H. Burke, it was decided to publish the above abstract of proceedings and preserve the full correspondence in the office of the Secretary of the Council.

On motion by Otto F. Claus, seconded by C. Lewis Diehl, applicants for membership Nos. 95 to 171 inclusive were duly elected.

Charles A. Rapelye, Chairman of the Finance Committee, reported as follows:

To the Council of the American Pharmaceutical Association :

Gentlemen : The duties of the Finance Committee as defined by the Rules of Finance are somewhat indefinite in character, but one clearly defined duty is that of presenting to the Council previous to June 1st of each year a list of the appropriations necessary to cover the expenditures for the coming fiscal year, the total sum of such appropriations to be based on the probable amount to be received from annual dues for that period.

In taking up the matter of appropriations your committee were led to the conclusion that the finances merited at this time more than ordinary attention; therefore a special meeting of the committee was called to meet with the Treasurer at Atlantic City, April 26, 1904.

After a most careful consideration of our financial condition it was decided to recommend to Council that no list of appropriations be made for the coming fiscal year, July, 1904, to July, 1905, as provided in the Rules of Finance, until the meeting of Council at Kansas City, when a full discussion could be had of a proposition to institute economies in the publication of the proceedings, and also a proposed reduction in the salaries of the officers or any other measure of economy which would tend to the betterment of our finances.

Your committee find the condition of the finances capable of improvement, but the condition is by no means of such a character as to cause any concern.

In view of these considerations the following motion was made and adopted, to be submitted to the Council for their vote:

"It is moved by Charles A. Rapelye, and seconded by Clement B. Lowe, that the pre-

sentation of the financial budget for the coming fiscal year be deferred until the next meeting of Council at Kansas City."

This motion was unanimously adopted by the Council.

In all associated bodies the question of finance is always a vital one, at the present that question demands of us our best thought and action, as our future prosperity and accomplishment depends largely on the wisdom exercised in dealing with this momentous question, and it is our purpose to strongly impress upon you the necessity for strict economy in expenditure and the wise disposition of the financial problem. No matter of sentiment should deter us from prompt and efficient action or allow us to defer taking the necessary steps to secure from this Association an improved and stronger financial condition.

The schedule prepared by the Treasurer shows that for the past few years our expenses have usually exceeded our income, and we have drawn to some extent upon our invested funds. The cash taken from the treasury in 1891 to the amount of \$3,021.62, and placed in bonds, and termed the General Fund, having been expended for general expenses.

At our last annual meeting it was voted to convert the Life Membership Fund into the Wm. Proctor Fund, with all accumulations from interest and also payments from those becoming life members, to apply to said fund until it shall have reached the sum of \$25,000.

This vote took from our available funds about \$14,000, and applied that sum to a specific purpose, and by applying to that fund all interest derived therefrom we reduced our annual income to an extent of about \$450.

While we are in most hearty accord with the sentiment which prompted this action we must question the wisdom of such application of the fund until such a time as the Association shall have reached and shown itself able to maintain a financial position which will allow it to divert its funds for a specific purpose, and we also deplore the action which placed the interest where it may not be available, if necessary, to the welfare of the Association.

In considering this phase of the question we have given special attention to the fact that life members have ceased to be a source of income, yet they must be supplied with a copy of the Proceedings, hence it is imperative that the income from a fund largely created by the anticipated payment of dues by those becoming life members should be available for the payment of a share of the cost of the Proceedings. While we may desire to accord the highest honors to those who in the past have labored for the advancement of pharmacy, we must not forget that in order to maintain the life and usefulness of this Association it should retain the full control of its invested funds, and the income therefrom.

Our responsibilities lie in the present and our work must be for the benefit of present and future members, and our resources should be so conserved that the work of the association shall not be impaired, as any sign of weakness in work done or results accomplished will at once deter many from becoming members and thus prevent additions to our strength numerically and financially.

It is also important that we make special note of the fact that by established precedent and a requirement of our by-laws as well, annual dues shall be paid in advance. As a considerable part of the dues are so paid it results that the report of the treasurer must show an amount of cash in the treasury which is to some extent misleading, as all that has been paid in advance actually belongs to funds with which we must meet our expenditures for the coming year and cannot in any sense be considered as a surplus.

If we are not led into unusual or extravagant expenditure by the presumption that we are better off financially than the condition, if carefully analysed, will demonstrate, we shall be able to so manage affairs that no crisis will arise, but any departure from sound financial procedure is extremely unwise.

That a reduction in the expenses of this association must be made at this time is without question; how best to make the necessary reduction is a matter for our serious consideration.

The expenses may be divided into three general classes, viz :

- 1st. Salaries, also including traveling expenses of the secretary and treasurer.
- 2nd. Proceedings, also including journals for the Reporter on the Progress of Pharmacy.
- 3rd. Sundries, including prizes, postage and all general expenses.

After a thorough consideration of the entire subject we have decided to make the following recommendations :

1st. That the Council be given power to authorize the treasurer to use for general expenses the whole or part of the interest from the Wm. Procter Fund for the next five years if in their judgment it shall be deemed necessary.

2nd. That the payment of the traveling expenses of the treasurer be discontinued.

3rd. That the salaries of the General Secretary, Treasurer, Reporter on the Progress of Pharmacy and Secretary of the Council and Secretary of the Committee on Membership be reduced to the extent of 20 per cent.

4th. That the Proceedings be condensed as far as possible, and to reduce the cost of the volume the Committee on Publication exercise the power given them by the by-laws, to eliminate much unnecessary and undesirable matter which now cumbers the volume.

We would further recommend that the Council be given ample authority to scale down appropriations made by the general sessions to such a point as may be necessary to keep expenses within the income.

With a full realization of the fact that the officers are not now fully compensated for the work they are called upon to perform, and while we extremely regret the necessity for any reduction in salaries, we must face the situation as it exists and make every effort to keep our expenses within our income if a financial crisis is to be averted. These recommendations, if adopted, will we believe tend to place the Association on a stronger financial basis without recourse to the temporary tiding over of our finances and the creating of obligations which we must eventually meet.

Respectfully submitted,

CHAS. A. RAPELYE, *Chairman.*

The above report was discussed by Messrs. Sheppard, Caspari, Payne, Eliel, Hallberg Rapelye and Hopp. On motion of Lewis C. Hopp, seconded by E. G. Eberle, the report was received.

On motion by S. A. D. Sheppard, seconded by Leo Eliel, the chairman was requested to appoint a committee of three to formulate proposed amendments to the Constitution and By-laws to conform with the report of the Finance Committee. The chair named Charles A. Rapelye, Lewis C. Hopp and W. A. Puckner to constitute the above committee.

On motion by S. A. D. Sheppard, seconded by C. S. N. Hallberg, the report of the Finance Committee was made a special order for the next session of the Council.

H. M. Whelpley, Secretary of the Committee on Membership, submitted the following report :

REPORT OF THE SECRETARY OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association :

Following the close of the fifty-first annual meeting at Mackinac Island, Michigan, August 3 to 8, 1903, I notified the applicants of the action of the Association and urged them to complete their membership. One hundred and eighty-eight responded.

A New Method of Electing Members. A change in the By-laws made at the 1903 meeting gives the Council authority to elect members at the regular meetings and by

correspondence during the intervals between meetings. Article II of Chapter VII of the By-laws reads as follows:

Every applicant for membership shall require the endorsement of two members of the Association in good standing, and each applicant must receive the affirmative vote of three-fourths of the members of Council for election, after which his membership shall be completed by his signing the Constitution and By-laws and paying the annual dues for the current year. Any applications for membership made prior to March 1st shall be considered as of the current fiscal year.

Thirty new members were added to the roll by vote of the council between the date of the 1903 meeting and March 1, 1904. This makes a total of 218 new members credited to the year 1903, but only 188 of them belong to the administration of that year. Up to the date of this report, September 5, ninety-four members have been elected, but the Association year "1904" does not close for new members until March 1, 1905. To this administration must be credited 30 new members of last year, the 94 just mentioned and all elected before the adjournment of this meeting.

The new method of electing members has, after one year's trial, proven very satisfactory.

A New Form of Application Blank. The revised form of application blank (see Proceedings for 1903, page 50) has simplified the work of the handling of new names. A new form of completion blank has also been adopted. This combines the notice of election with the portion of the Constitution to be signed. As many of the members do not understand the significance of the completion blank system, I give below a copy of the blank in full.

No.....

American Pharmaceutical Association.

Organized October 7, 1852.

Office of the Secretary of Committee on Membership.

ST. LOUIS, MO.,.....190.....

MR.....

DEAR SIR:

The Council of the American Pharmaceutical Association has approved your application for membership and instructed me to invite you to complete your membership by signing the following blank form, and sending the same to the undersigned. If you have paid the annual contribution of five dollars for the current year, there is no other expense, unless you wish to obtain a Certificate of Membership. This will be furnished by the Treasurer, MR. S. A. D. SHEPPARD, 1129 Washington Street, Boston, Mass., on receipt of \$5.00 for certificate on paper, or of \$7.50 for certificate on parchment.

The fifty-second annual meeting will be held at Kansas City, Mo., September 5, 1904.

The proceedings published annually by the Association make a volume of about 1,000 pages, which constitutes a valuable record of the progress of Pharmacy during the year, and will be sent free of charge to each member in good standing.

The action of the Association in inviting you to membership is prompted by the desire to have upon its roll the names of such Pharmacists and others as take an interest in the advance and success of American Pharmacy, thereby increasing the usefulness of this National Organisation, which can point with pride to its honorable record of more than half a century.

COMPLETION OF MEMBERSHIP.

Approving of the objects of the American Pharmaceutical Association, and having read Article I of its Constitution and Articles I to VI of Chapter VII of the By-Laws (see other side of this sheet), I hereby signify my approval of the same, and subscribe to them.


(NAME IN FULL)*

* Write legibly or print name in full. Initials are not sufficient.

STREET,

TOWN,

DATE..... STATE

 Changes of address should be reported at once to the General Secretary. The Association will not duplicate Proceedings lost through neglect of this duty. (See Proceedings, 1886, p. 66.)

If you have not paid the annual contribution, five dollars, for the current year, please enclose it with this blank.

Mail as soon as convenient, to

H. M. WHELPLEY,

If convenient, paste printed
name and address here.

Secretary Committee on Membership,
2342 Albion Place,
St. Louis, Mo.

The official Gold Badge will be sent postpaid on receipt of \$2.00.

On the reverse side is printed Article I. of the Constitution and Articles I. to VI. of Chapter VII. of the By-Laws.

William Mittelbach, Chairman of the General Committee on Membership and Reception, will report the detail of the work of soliciting new members since our last annual meeting.

REPORT ON MEMBERSHIP FOR YEAR ENDING WITH PUBLICATION OF 1904 PROCEEDINGS.

Active Membership.

Contributing members in good standing at last report.....	1282
Members added since last report.....	220
Total.....	1502

Loss in Active Membership.

By resignation.....	29
By transfer to life membership.....	19
By death.....	15
Dropped from the roll for various reasons.....	49
Total.....	112
Number of contributing members on roll at this report.....	1390

Life Membership.

Number on roll at last report	123
Number added since last report.....	19
Total.....	142

Loss in Life Membership.

By death.....	3
Number of life members on roll at this report	<u>139</u>

Honorary Membership.

Number on roll at last report	10
Additions	0
Total.....	<u>10</u>
Loss by death	0
Number on roll at this report.....	<u>10</u>

Total Membership.

Contributing members	1390
Life members.....	139
Honorary members.....	10
Total.....	<u>1539</u>
Total on list last year.....	<u>1409</u>
Net gain since last report	<u>130</u>

Resignations and suspensions have removed some names from our list. But Death, who levels all things in his march and whom naught can resist in his mighty strength, has also decimated our membership. The call came to some of the youngest members and also to those who had lived

"Till like a clock worn out with eating time,
The wheels of weary life at last stood still."

No more shall we see the pleasant face of Henry Martin Whitney, of New Hampshire, who contributed to the success of many of our meetings. William Henry Averill, of Kentucky, was a quiet but earnest worker who became near and dear to many of us. George Lewis Hechler, of Ohio, with his clear practical way of viewing subjects, turned the tide in many of our debates. Henry Fred. Hassebrock, of Missouri, was with us one year ago working for new members, as he had done at almost a score of previous meetings.

To-day we record the death of these and many other worthy members who have honored us with their affiliation.

Name.	Address.	Joined.	Died.
Averill, William Henry,	Frankfort, Ky.,	1874	May 21, 1904
Brown, William T.	Madison, N. J.,	1894	Aug. 28, 1904
Dearborn, George Luther,	New Market, N. H.,	1853	Sept., 1902
Ewell, Ervin Edgar,	Atlanta, Georgia,	1898	Feb. 7, 1904
Golden, Lee Hampton,	McLoud, Oklahoma,	1900	Apr. 20, 1903
Gove, David Merritt,	San Francisco, Cal.,	1902	Sept. 28, 1903
Greve, Charles Mathias,	Chattanooga, Tenn.,	1887	July 4, 1904
Hassebrock, Henry Fred,	St. Louis, Mo.,	1884	Mar. 21, 1904
Hechler, George Lewis,	Cleveland, O.,	1882	May 18, 1904
Huhn, George,	Minneapolis, Minn.,	1884	Oct. 30, 1903
Kienth, Hans,	Milwaukee, Wis.,	1884	June 19, 1904
Moore, George,	Somersworth, N. H.,	1859	Dec. 26, 1904
Sargent, Ezekiel Herbert,	Chicago, Ill.,	1864	Apr. 24, 1904

Name.	Address.	Joined.	Died.
Schafhirt, Adolph Julian,	Washington, D. C.,	1876	Sept. 14, 1903
Smith, George Wallace,	St. Louis, Mo.,	1901	June 1, 1904
Walker, William John,	Albany, N. Y.,	1880	May 8, 1904
Warren, William Matthew,	Detroit, Mich.,	1889	Nov. 11, 1903
Webb, William Martin,	Philadelphia, Pa.,	1867	Dec. 20, 1903
Whitney, Henry Martin,	N. Andover Depot, Mass.,	1859	Dec. 2, 1903
Williams, William Hudson,	Wheeling, W. Va.,	1880	

William Henry Averill, of Frankfort, Ky., died at his home in that city, May 21, 1904. He was born in Louisville, Ky., in 1834. He moved with his parents to Franklin county when twelve years of age. In 1853 he left the farm and entered the drug business. Three years later he bought a store in Frankfort. This business he continued for half a century in the same locality. Mr. Averill joined the A. Ph. A. in 1874, and attended many of its meetings. He was a welcome delegate and made warm friends of all who knew him. He was a member of the first Kentucky Board of Pharmacy, serving two terms, from 1874 to 1882. He was president of the board from 1878 to 1882. He was first president of the Kentucky Pharmaceutical Association, and served two terms in that position.

Mr. Averill was an active man in his community. He took great interest in religious matters, and was one of the elders of the First Presbyterian Church in Frankfort at the time of his death. This position he had held for thirty-eight years. He also held the position of clerk in the church for thirty-four years. He wrote a history of the Presbyterian Church in Frankfort. It dated back to primitive times and constitutes a very interesting volume. The church dates back to 1824.

Mr. Averill leaves two sons, Thomas and Marvin, who will continue the business in the name of W. H. Averill's Sons.

George Luther Dearborn, of New Market, N. H., died in September, 1902. He joined the A. Ph. A. in 1853.

Lee Hampton Golden, of McLoud, Oklahoma, died at Edgewater, Col., April 20, 1903. He was born in West Virginia, January 29, 1871. In 1896-7, he took the junior course at the St. Louis College of Pharmacy. He was married in 1898 to Ella I. Holden and moved to Choctaw, Okla., then to McLoud, where he lived until his health compelled him to give up business. His honest industry and friendly manner won the confidence of his customers and the friendship of many of Oklahoma's druggists. He was very much interested in the A. Ph. A., which he joined in 1900.

David Merritt Gove, of San Francisco, Cal., died at his home in that city, September 28, 1903, of Bright's disease. He was born in San Francisco, November 24, 1856. He was engaged in the retail business on his own account over twenty-three years in the same locality. He was highly esteemed by those who knew him professionally, for his integrity and his quiet, unassuming manners. He graduated at the California College of Pharmacy in 1881. Mr. Gove joined the A. Ph. A. in 1902.

Charles Mathias Greve, of Chattanooga, Tenn., was born in Kiel, Germany, August 27, 1840, his father, Joachim Greve, the author of several standard works on history, being a teacher in the University of Kiel. In 1848, partly on account of the father's health and partly by reason of sympathy for the revolutionary party in Schleswig-Holstein, the family removed to America and resided for a number of years on a farm in southern Illinois. Here, young Greve obtained his education in the country schools of the neighborhood, supplemented by private instruction from his father. In October, 1861, he enlisted in the volunteer army and remained in the service until mustered out

in the fall of 1864. In December of that year he went to Cincinnati, and into the drug business with his brother, Dr. T. L. A. Greve, on the corner of 6th & John Sts. He studied medicine and practiced for a short time in Jacksonburgh, Butler Co., Ohio, but gave that up to return to Cincinnati, where in 1875 he graduated from the Cincinnati College of Pharmacy. He continued in business with his brother until the spring of 1888 when the partnership was dissolved, and Dr. Greve went to Chattanooga, Tenn., where he bought the drug store on the corner of Market & 6th Sts., at which stand he continued in business until a short time before his death, which occurred July 4, 1904. Dr. Greve was always deeply interested in his profession, and was an active member both of the American Pharmaceutical Association (joined in 1877) and of the Tennessee Association of Retail Druggists. In 1901, Dr. Greve was appointed a member of the State Board of Pharmacy. He served on the Board until forced by ill-health to resign in January, 1904. In September, 1883, Dr. Greve was married to Miss Jeanette S. Smith, and to them were born two daughters, Dorothy and Harriet, who with their mother survive him.

Henry Fred. Hassebrock, of St. Louis, Mo., died at his residence at Nineteenth and Wright streets, March 21, 1904. Mr. Hassebrock was born in St. Louis, November 15, 1858. He was educated in the German and public schools of the city, and served his apprenticeship as a pharmacist with Dr. A. H. Vordick. He graduated at the St. Louis College of Pharmacy in 1879, and purchased a store at Thirteenth and Wash, which had been established by C. D. Chase. In 1885, Mr. Hassebrock opened a branch store at Nineteenth and Wright Sts. He soon after sold the Wash street store to his brother, J. F. Hassebrock. Mr. Hassebrock conducted a prosperous business at Nineteenth and Wright streets up to the time of his death. He joined the A. Ph. A. in 1884, and was a frequent attendant at the annual meetings during the following years. Mr. Hassebrock joined the Alumni of his Alma Mater as soon as he graduated. He held various offices in the Alumni Association of his Alma Mater. He also served for a number of years as Treasurer of the Retail Druggists' Association of St. Louis, and was considered one of the most ardent workers in the organization. He joined the Missouri Pharmaceutical Association in 1883, and held various offices as well as serving upon important committees. In fact, Mr. Hassebrock was an Association worker, and one of those who never sought office, but worked solely for the good of the cause. He valued the A. Ph. A. above all other Associations.

George Lewis Hechler, of Cleveland, O., died at his home in that city, May 18, 1904. Heart disease, with which Mr. Hechler had suffered for several years, caused his death, which occurred within one-half hour of the beginning of the fatal attack. Mr. Hechler was born in Germany fifty-four years ago. He came to Cleveland when eleven years of age. He served his time as an apprentice and became the proprietor of two stores, both located on Broadway. He was an influential business man, and successful in his enterprises. He took an active part in politics, being identified with the Republican party. He was at one time director of the fire department of the city. He was prominent in several German organizations, being president of the German-American Club at the time of his death. Mr. Hechler joined the A. Ph. A. in 1882, and, in company with his family, attended many of the meetings. His counsel was valued in the meetings, where he spoké with earnestness and much to the point. He served a term as a member of the Ohio Board of Pharmacy, and was one of the delegates who organized the N. A. R. D. Mr. Hechler was twice married and leaves two sons and two daughters.

George Moore, of Great Falls, N. H., died December 26, 1902. He was born at Somersworth, N. H., February 25, 1826. He learned the drug business in Boston, where he was clerk for several years. Was engaged in the drug business at Great Falls,

forty-four years. George Moore led a successful life. None in his locality was better known than he. He made friends and kept them. His natural abilities were of a high order. His influence was elevating. The circle in which he moved was benefited by his presence. Clear-minded, courteous and able, he overcame obstacles that would have overwhelmed the weak. He loved his vocation. He was an observer of events and conditions; was well informed and a good conversationalist. He was strong in all things that went to make up a manly man. He was full of energy and life. The losses he sustained would have broken down a man of weaker nature. He loved the young and ever had a pleasant word for them. He was a modest man. Fame was the last infirmity to which he aspired. At one time he was a director in the Great Falls National Bank. He was deeply interested in Masonry and was a member of Libanus Lodge. He became a member of the American Pharmaceutical Association in 1859, and the New Hampshire Pharmaceutical Association in 1874. He was registered in October, 1882. Mr. Moore is survived by a widow, Frances H.

William John Walker, of Albany, N. Y., died at his home, May 9, 1904. A stroke of apoplexy occurred while Mr. Walker was horse-back riding in the park, and he expired within a few minutes. Mr. Walker was born in Albany, N. Y., in 1853. His first experience in the drug business was with Archibald McClure. He joined the A. Ph. A. in 1880. He was a member of the wholesale drug firm of Walker & Gibson. He held a prominent position in business circles of the city, and served as president of the police commission. He was an ex-president of the National Wholesale Druggists' Association, and, at the time of his death, chairman of the committee on membership. He is survived by a widow, one son and four daughters.

William Matthew Warren, of Detroit, Mich., died at his home, November 11, 1903. His death removed a chief figure in the industrial pharmacy of America. Mr. Warren was a real captain of industry, one of the few which the drug trade has so far developed. It was while this Association was in session last year that Mr. Warren fell ill of a low and baffling fever, which was not at first thought serious, but which persisted for several weeks. Recovering somewhat, he went South to recuperate, and so far improved that he started back for Detroit in October. While en route he was visited with an attack of acute indigestion, and from then on he grew steadily worse. A specialist was brought to Detroit from the East; an operation was performed, but nothing availed, and death finally occurred from an acute spinal disease. The son of Major Archibald Warren, of the Confederate cavalry, Mr. Warren was born in 1864, at Smith's Station, Alabama. After an education secured in the public schools, his parents having meanwhile moved to Elizabeth, N. J., he entered the employ of the New York branch of Parke, Davis & Co. at the age of sixteen. He did the humbler work of a general factotum, which every young boy under such circumstances is called upon to perform, but he did not do it long. He was not born to be a messenger boy. In a surprisingly short time he was purchasing agent and the next step was his transference to the home office at Detroit. Reaching this larger field of opportunity at the age of twenty-two, he began at once the upward path, and never stopped until he had run the entire gamut, out-distanced every competitor, and landed in the chair of general manager. In 1896, when but thirty-two years' old he was made commanding general of all the Parke-Davis forces.

The secret of his brilliant career was three-fold. He knew how, and loved to discover talent. Into the hands of dozens of obscure and untried men he put the key of opportunity. Wholly free from national antipathy, race prejudice, or social narrowness, he measured his lieutenants by the single standard of ability to produce results. As an organizer, as a co-ordinator and manager of men, his rare gifts would have brought him fame in public life. He had an eagle's eye for opportunity and an insatiable appetite for fresh enterprise in fields that remain unperceived by the dull vision of the mediocre.

In the arts of mercantile construction he was a gifted architect; and to build, to build, was the darling occupation of his bold and aspiring mind.

Mr. Warren was married in 1893 to Mary C. Buhl, daughter of Theodore D. Buhl, a leading business man and capitalist in Detroit. Mrs. Warren died three years before her husband, and a daughter of nine years, Elizabeth Buhl Warren, survived her parents. Always prominent in his church connections, Mr. Warren was at the time of his death a deacon in the Fort Street Presbyterian Church and a member of the Presbyterian Club of Detroit. He was also of strong social proclivities and a member of several clubs.

William Henry Webb, of Philadelphia, Pa., died at his home in that city, December 20, 1903. He was born January 16, 1835, in Philadelphia, which city was his residence throughout life. In 1860, he was in the drug business with John E. Grove. In 1862, he was appointed chief druggist at the Armory Square Hospital, of Washington, but was soon transferred to the Government Laboratory in Philadelphia as assistant to Chief Chemist, John M. Maisch. He graduated at the Jefferson Medical College in 1866. He was for some time a teacher in the institution. He also graduated from the Army and Navy College, and from the Philadelphia College of Pharmacy in 1868. He joined the college in 1869. He was a member of the College of Physicians and of Post 2 Grand Army of the Republic. He was sergeant of the Post twenty-three years. Dr. Webb joined the A. Ph. A. in 1867, and continued his membership throughout life although he was engaged in the practice of medicine since 1868.

Henry Martin Whitney, of North Andover Depot, Mass., died December 2, 1903, at his home. He was in the seventy-sixth year of his age. He was born in Winchendon, Mass., and went with his parents to Lowell when quite young. He attended the public schools of Massachusetts and worked for a while, as a boy, in the counting-room of the Massachusetts Corporation, and when about seventeen, was apprenticed to Carleton & Hovey, to learn the drug business. At the expiration of five years with them he went to Lawrence, Mass., and established a drug business under the name of Wilson & Whitney, soon, however, buying his partner's interest, and he continued this business until 1899.

With other pharmacists of the State Mr. Whitney was much interested in establishing a pharmacy law, and being a personal friend of Governor Robinson, was largely instrumental in convincing him that it was his duty to affix his signature to the law passed by the legislature of 1885. The governor appointed Mr. Whitney one of the five commissioners to carry out the provisions of this law. With his characteristic energy and business ability, Mr. Whitney entered upon this work, and it was due to him more than any other one man that the law, so imperfectly constructed, was made of practical value to reputable pharmacy and the general public. He served as president of the Board during the entire fourteen years he was a member. He was local Secretary for the White Mountain meeting of the A. Ph. A. in 1891. He was also president of the Massachusetts Pharmaceutical Association in 1892, and of the American Pharmaceutical Association in 1897. He held various offices in Grace Episcopal Church, of Lawrence. Mr. Whitney was active and energetic until the last year or two, when bodily infirmities compelled his yielding thereto, but his mind was active and vigorous to the last.

The funeral service was held at his late home and attended by many sincere friends, several of whom were A. Ph. A. members. He was buried at Lowell with kindred who had gone before. He leaves, as near relatives, a widow, four sisters, and several nephews and nieces.

Mr. Whitney was one of the oldest members of the A. Ph. A., having joined in 1859.

The Secretary read the following report of the Auditing Committee.

PHILADELPHIA, July 15, 1904.

To the American Pharmaceutical Association :

Gentlemen : The committee appointed to audit the accounts of the General Secretary would report that they have examined them and find them correct, all moneys having been properly paid over to the Treasurer. We think it would facilitate the audit if the Secretary would keep in addition a general cash account.

We have examined the accounts of the Treasurer and find them correct, and that the general cash balance now on deposit with the New England Trust Co. is\$3,164 66
 Added 260 00
 \$3,424 66

We have also examined the accounts and sworn statements of the Chairman of the Council as verified by the President of the Association and find them correct, the invested funds of the Association being properly accounted for and amounting to \$17,412.41.

CLEMENT B. LOWE,
 CHAS. W. HANCOCK,
 WILLIAM MCINTYRE.

On motion by H. B. Mason, seconded by George F. Payne, the report was received and adopted.

S. A. D. Sheppard moved and W. A. Puckner seconded that Article II of Chapter VIII of the By-laws be amended by substituting the word, "January" for "March" in the last line. The amendment was laid over under the rules.

S. A. D. Sheppard moved and A. M. Roehrig seconded that Alexander K. Finlay, Joseph P. Morrison and William Simpson be made life members, old style, without proceedings. The motion carried.

Charles Caspari, Jr., Chairman of the Committee on Publication, submitted the following report :

REPORT OF THE COMMITTEE ON PUBLICATION.

Mr. Chairman and Members of the Council of the American Pharmaceutical Association :

Your Committee on Publication beg leave to report that the Proceedings of the fifty-first annual meeting have been published and a copy of the same delivered in May of the present year and since that time to every member entitled thereto, according to the Treasurer's accounts, besides the usual number (about 100) of complimentary copies to the honorary members, state libraries, the pharmaceutical press, educational institutions and foreign scientific bodies. Owing to the protracted illness of the Reporter on the Progress of Pharmacy, the annual report of that official did not reach our hands until February of the current year, and hence an unavoidable delay of three months occurred in the issue of the book. Of the total number of books (1650) printed, 255 copies remain on hand in flat sheets, 1340 having been bound in cloth and 55 in paper. It was also found necessary during the past year to bind in cloth 25 copies each of the 1900 and 1901 volumes of Proceedings and 150 copies of the 1902 volume, the stock having become exhausted. The cost of publication and delivery for the year 1903-1904 is shown by the following items:

Composition, paper and press work (1650 copies)	\$2,306 79
Binding 1,340 copies in cloth (1903) @ 23 cents.....	\$308 20
" 150 " " (1902) @ 28 cents.....	42 00
" 25 " " (1901) @ 23 cents.....	5 75
" 25 " " (1900) @ 23 cents.....	5 75
" 55 " in paper (1903) @ 8 cents.....	4 40

Expressage and Postage: Expressage (cloth 29, 30, 35; paper 25, 26); Postage (cloth 29; paper 26).....	\$449 53
Illustrations.....	36 86
Journals for the Reporter (Foreign, \$29.95; Domestic, \$13.71)	43 66
Salary of the Stenographer	200 00
Salary of the Reporter on the Progress of Pharmacy	750 00
	<hr/>
	\$4,152 94

In accordance with instructions received at the last annual meeting and in conformity with the handsome and very liberal offer of the publishers of *The Druggists' Circular*, *The American Druggist*, *Merck's Report*, *The Bulletin of Pharmacy* and *The Pharmaceutical Era*, your committee undertook the publication of the complete index of the first fifty volumes of *Proceedings*, and it was our hope to have the work completed before the present meeting. The disastrous conflagration at Baltimore in February last, which destroyed over 2,400 buildings in the heart of that city, brought our efforts to a sudden end, a large portion of the manuscript and all of the finished work on the semi-centennial index having been burned. Fortunately an insurance which your committee had placed on the manuscript before sending it to the printers saved the Association from financial loss. Reconstruction of the index was begun in due time, and we are glad to be able to report that composition and press-work are at this date again going on. If no unforeseen accidents occur, it is expected to have the index volume ready for delivery in the fall, and your committee would recommend that the selling price of the book be fixed at \$5.00 per copy. Your committee would further suggest that a special vote of thanks be tendered to the gentlemen who have so generously come to the aid of the Association and by their liberality made possible the publication of an index which we hope may prove useful to all interested in pharmacy and its allied branches.

For the Committee,

CHAS. CASPARI, JR.,

Chairman.

Baltimore, August 5, 1904.

On motion by H. M. Whelpley, seconded by W. H. Burke, the report was adopted.

On motion by S. A. D. Sheppard, seconded by E. G. Eberle, it was decided to reconsider the official program.

On motion by S. A. D. Sheppard, seconded by Leo Eliel, the program was referred back to the Committee on Program with instruction to, if practicable, shorten the program, so that the association could adjourn Friday night. The Council then took a recess.

On re-convening, the Committee on Program reported that they did not find it practical to shorten the official program, but recommended that the Section on Education and Legislation meet Wednesday, at 8 p. m., in place of Thursday, at 10 a. m., and that the meeting of the Scientific Section be changed from Thursday, 3 p. m., to Thursday, 10 a. m. On motion by Otto F. Claus, seconded by C. Lewis Diehl, the report was adopted.

Chairman Beal announced the following Committee on Credentials: A. M. Roelhrig, W. H. Burke and George F. Payne.

On motion by C. S. N. Hallberg, seconded by Lewis C. Hopp, the Council adjourned.

Mr. Hynson moved to approve the minutes as read. Mr. William C. Wescott, of Atlantic City, with the view to giving the members returning through St. Louis an opportunity to visit the World's Fair on Saturday, proposed the following:

Moved, that the program submitted by the Council stand as at present, with the exception that the meeting of the Section on Practical Pharmacy and Dispensing set for Saturday morning be changed to Wednesday evening, after the return of the Association from Fort Leavenworth, and that the last general session set for Saturday afternoon be held instead on Friday evening, at 8 o'clock.

After discussion of the proposition of earlier adjournment by Messrs. Holzhauer, Wescott, Mayo, Bernstein, Wilbert and Hancock, all favoring it, the motion of Mr. Wescott was put to a vote and carried with applause. On motion of Mr. Sheppard, the minutes of the Council, with the amendment just made, were adopted. Mr. Whelpley then called the attention of the members to the fact that the St. Louis College of Pharmacy had arranged to extend some special courtesies on Monday, Tuesday and Wednesday of next week to members visiting the Fair, and requested that those anticipating being in St. Louis at that time should leave their names with Mr. Otto F. Claus, president of the College.

The President announced the following Committee on Time and Place of Next Meeting: H. P. Hynson, of Baltimore; C. A. Rapelye, of Hartford; Otto F. Claus, of St. Louis; C. A. Mayo, of New York, and Leo Eliel, of South Bend, Ind. Mr. Ebert, of Chicago, said he would like to call the committee's attention to the desirability of having the next meeting in New York City, for the advantage it would be in the way of bringing in new members. Mr. Sheppard, of Boston, spoke of a letter he had had from Plattsburg, N. Y., on Lake Champlain, inviting the Association to have its next meeting there.

Upon motion of Mr. Eliel, the Association then adjourned until tomorrow (Tuesday) morning at 9:30 o'clock.

SECOND SESSION—TUESDAY MORNING, SEPTEMBER 6, 1904.

The second general session was not called to order until 10 o'clock a. m., the members being a little late in assembling.

The Secretary read the minutes of the first session, which, on motion of Mr. Claus, of St. Louis, were ordered approved as read.

The chair then called on Mr. F. A. Faxon, of Kansas City, who was present as chairman of the delegation from the National Wholesale Druggists' Association to this Association, to address the convention, which he did at some length and in a very felicitous manner, referring, among other things, to the great antiquity of the art pharmaceutic, as illustrated in the lives of Aesculapius, Hippocrates, Servetus and others of its earlier disciples; the long, honorable and useful career of this Association, and the great good it had accomplished in raising the standard of American pharmacy, and closing with hearty words of greeting and good will on behalf of the national body he represented.

Mr. William McIntyre, of Philadelphia, as spokesman of the delegation

from the National Association of Retail Druggists, was called upon, and addressed the Association on behalf of that body, recounting its steady growth and influence, and the betterment of conditions brought about through its efforts, and reciting its natural affiliation with this body and the good it was destined to bring to it by way of increase of membership.

The Secretary read and offered the following proposed amendment to the By-Laws :

Amend Article IV, Chapter VII, by striking out all after the word "of" in the second line and inserting in place thereof the following: \$100.00 during the first year of his connection therewith, or after ten years \$75.00, or after fifteen years \$50.00, shall become a life-member and shall be exempt from all further annual contributions.

The Secretary explained that this amendment was quite a modification of Article IV as now constituted, and was offered with a view of strengthening the finances of the Association, and he believed it would prove acceptable to all who had the true interest of the Association at heart.

Under the rule, the proposed amendment was laid over to the next session.

Mr. S. A. D. Sheppard, of Boston, being granted leave, made a statement at this point as to the causes of delay in issuing the new Pharmacopœia.

MR. GOOD: I move that the statement be received and made a part of the minutes of this Association. I am exceedingly glad to make that motion. The communication is timely, and it is well put, and if there has been any disposition to criticise the Committee on Revision, and particularly the Chairman, I hope that all those who were so disposed will see the difficulty under which the Chairman has been working. The facts have been tersely and well put, and this is information which is valuable to all of us.

Mr. Claus seconded the motion of Mr. Good, and Mr. Mayo asked consent of the mover to amend to express the thanks of the Association as well to the Board of Trustees for the information conveyed, and the Association's appreciation of the excellent work being done by the Committee on Revision and its Chairman.

Consent was given, and the chair put the vote on the motion as amended, and it carried.

The statement by Mr. Sheppard was as follows :

MR. President: I ask the courtesy of this meeting to make a statement with reference to the new Pharmacopœia. It is not Association business, but interests all our members and also the representatives of the pharmaceutical press, and through them can probably be given indirectly to the medical profession. There are present at this meeting four of the seven trustees of the U. S. P. convention; also our Secretary, Dr. Murray Galt Motter, of Washington, whose active and intelligent work during the past four years has made his opinions valuable and respected by every member of the board. The members who are not here are our chairman, Mr. Charles E. Dohme, Prof. Remington, chairman of the Committee of Revision, and Dr. Horatio C. Wood, president of the Convention. There is a good reason for the absence of each of these men. The four men who are

here with the Secretary had a long informal conference last evening. It was the unanimous, individual opinion of all that this statement should be made, and I was asked to make it. This long preface to what I am about to say is given, so that there may be no misunderstanding as to conditions. This is *not* an *official* statement, but the personal individual opinion of five men.

There has been great delay in the issuing of the new Pharmacopœia, but this delay has been absolutely unavoidable. The amount and difficulty of the work are something that cannot be appreciated by one outside. We ask your very warm sympathy, rather than your harsh criticism, for the Chairman of the Committee of Revision, Prof. Remington. His work has been and is burdensome to a degree. He has done it, and is doing it splendidly. Only the most pressing reasons and those connected with pharmacopœial work keep him from this meeting, where he could personally consult with the many members of the Revision Committee who are here present. Please remember that such work as Prof. Remington has been, and is now, doing, is what unquestionably caused the untimely death of Dr. Charles Rice.

It seems a physical impossibility that the Pharmacopœia should be issued till after January 1st. It will not go into legal effect until 90 days after it is issued, that is, not until after April 1st. Having knowledge of these facts, we five men, Motter, Beal, Ebert, Whelpley and myself feel that it is a moral duty to the medical and pharmaceutical professions to make this informal statement, because the facts are such that the new Pharmacopœia cannot be used in the schools during the coming winter, and the faculties should make their arrangements to work with the old one.

Mr. Sheppard expressed his doubts as to the propriety of printing this statement in the Proceedings, as it was not, properly speaking, Association business, but merely given for the information of the members. Mr. Whelpley, of St. Louis, agreed with Mr. Sheppard in this view, and called attention to a resolution just adopted by the Council directing the General Secretary, as Chairman of the Publication Committee, to cut out everything in the next volume of Proceedings that could properly be left out. Thereupon, Mr. W. C. Anderson, of New York, moved a reconsideration.

After discussion of the question by Messrs. Ford, Meissner and Ebert, the Chair put the motion to a rising vote, and twenty-six voted for a reconsideration of the motion to publish, but the vote opposed was so overwhelmingly large that it was not counted, and the Chair declared the motion to reconsider lost.

The report of the Nominating Committee was called for as the next order of business, and Chairman Hynson presented the following :

REPORT OF THE NOMINATING COMMITTEE.

To the President and Members of the American Pharmaceutical Association :

Your Nominating Committee have voted to recommend the following-named gentlemen for election as officers for the ensuing year :

For President—James H. Beal, of Ohio.

For First Vice-President—Philip C. Candidus, of Alabama.

For Second Vice-President—Wm. Mittelbach, of Missouri.

For Third Vice-President—Julius A. Koch, of Pennsylvania.

For Treasurer—S. A. D. Sheppard, of Massachusetts.

For General Secretary—Chas. Caspari, Jr., of Maryland.

For Reporter on the Progress of Pharmacy—C. Lewis Diehl, of Kentucky.

For Members of the Council for Three Years—Joseph L. Lemberger, of Pennsylvania; F. W. Meissner, of Indiana; Lewis C. Hopp, of Ohio.

Respectfully submitted,

HENRY P. HYNSON, *Chairman*.

EUG. G. EBERLE, *Secretary*.

The report was received with lively demonstrations of approval as Chairman Hynson read the names of the several gentlemen selected by the committee for the various offices named.

Mr. Good moved that the affirmative ballot of the Association be cast by President Hopp for Mr. James H. Beal, of Ohio, the committee's nominee for President for the ensuing year. The motion prevailed, and President Hopp announced that he had cast the ballot as directed, and declared Mr. Beal duly elected. On motion of Mr. E. G. Eberle, of Texas, seconded by Mr. Whelpley, of St. Louis, the President was also directed to cast the ballot of the Association for the remaining nominees of the committee. The President announced that he had performed this duty, and declared these gentlemen duly elected to the offices set opposite their names.

Mr. Sheppard called attention to the fact that a proposed amendment to Chapter VII, Article II, of the By-Laws was offered by the Secretary at yesterday's session, the effect being simply to substitute the word "January" for the word "March" in the last line of the article, and he moved the adoption of the amendment. Mr. Bernstein, of Louisiana, asked that the article be read for the information of the members, and the Secretary read it, explaining the change proposed, and stating that the experience of a year had shown the desirability of the proposed change. Thereupon, the motion of Mr. Sheppard to adopt the proposed change in the By-Laws prevailed.

After some announcements made by the chair for the local Secretary, Mr. Hynson offered the following amendment to the By-Laws, to take the regular course :

Amend Article VII, Chapter IX, of By-Laws, by introducing after "Dispensing," line one, the words "composed of members actually engaged in the retail drug business," so that the sentence will read: The Committee on Practical Pharmacy and Dispensing, composed of members actually engaged in the retail drug business, shall be elected by the Section on Practical Pharmacy and Dispensing.

Mr. Whelpley, Secretary of the Council, read the minutes of the third session of that body, held at 10 : 30 a. m., this day (September 6, 1904) :

THIRD SESSION OF THE COUNCIL—SEPTEMBER 6, 1904.

The Council was called to order by Chairman Beal at 9 : 30 a. m. On roll call the following responded: Beal, Burke, Caspari, Claus, Diehl, Eberle, Eliel, Hallberg, Hopp, Payne, Puckner, Rapelye, Roehrig, Sheppard and Whelpley. Mr. C. A. Rapelye reported as follows for the Committee on Proposed Changes in Constitution and By-Laws to conform with the report of the Finance Committee :

Amend By-Laws, Chap. vi, Art. I, by inserting in the third line, after the word "meeting," to reduce any appropriations that have been made whenever, in their judgment, the current receipts are not sufficient to allow the expenditure.

Amend By-Laws, Chap. v, Art. I, by striking out the word "of" in the second line and inserting in place thereof the words not to exceed \$750.00.

Chap. iv, Art. 4, by striking out all after the word "sale" and inserting in place thereof not to exceed \$600.00.

Chap. ii, Art. I, by striking out "of \$1000.00" in the second line and inserting in place thereof not to exceed \$800.00.

Chap. vii, Art. I, by inserting after "Materia Medica" in the fourth line, also editors and publishers of pharmaceutical journals.

The subject was discussed by Messrs. Eliel, Caspari, Hallberg and Burke.

On motion by C. S. N. Hallberg, seconded by H. M. Whelpley, the recommendations of the committee were adopted with the exception of the amendments relating to the salary of officers and the one relating to the traveling expenses of the treasurer.

On motion by S. A. D. Sheppard, seconded by A. M. Roehrig, applications for membership Nos. 172 to 183 inclusive were duly elected.

Chairman J. H. Beal submitted the following report as Chairman of the Council:

**REPORT OF THE CHAIRMAN OF THE COUNCIL ON THE INVESTED FUNDS,
AND INTEREST-BEARING FUNDS DEPOSITED IN SAVINGS BANK,
OF THE AMERICAN PHARMACEUTICAL ASSOCIATION,
ON JUNE 30, 1904.**

The investments in bonds, and the interest-bearing funds deposited in savings bank, in the custody of the Chairman of the Council on June 30, 1904, are as follows:

EBERT FUND.

Balance on Deposit in Boston Penny Savings Bank, Pass Book	
No. 56461	\$885 60

CENTENNIAL FUND.

1 Massachusetts State 3 % Bond, No. 1705	\$1,000 00
Balance on Deposit in Boston Penny Savings Bank, Boston,	
Mass., Pass Book No. 56462	954 98
	\$1,954 98

PROCTER FUND.

1 Massachusetts State 3 % Bond, No. 1701	\$10,000 00
3 Massachusetts State 3 % Bonds, Nos. 1702, 1703, 1704	3,000 00
Balance on Deposit in Boston Penny Savings Bank, Boston,	
Mass., Pass Book No. 56463	1,571 83
	\$14,571 83

Total, June 30, 1904	\$17,412 41
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Bond of American Bonding Company, of Baltimore, Md., on behalf of S. A. D. Sheppard, from March 15, 1903, to March 15, 1904, for \$5,000.00.

J. H. BEAL, *Chairman of the Council.*

On motion by W. A. Puckner, seconded by George F. Payne, the report was received and referred for publication.

It was moved by S. A. D. Sheppard and seconded by Charles Caspari, Jr., that the new committee on finance be instructed to bring in a budget for the fiscal year 1904-1905, the total amount of which shall not exceed \$6,000.00. The motion was adopted.

On motion by L. C. Hopp, seconded by C. S. N. Hallberg, the Council adjourned.

On motion of Mr. Bernstein, seconded by Mr. Beringer, the minutes of the Council were approved as read.

The chair called for report of the Committee on Time and Place of Next Meeting, but Chairman Hynson said the committee would not be ready to report at this session, and the chair said further time would be given.

The report of the Treasurer was called for, and Mr. Sheppard made his report as follows :

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL
ASSOCIATION, JULY 1, 1903, TO JULY 1, 1904.

RECEIPTS.

Cash on hand July 1, 1903.....	\$3,832 03
Received from sale of 12 certificates@\$.75.....	90 00
" " 11 certificates@\$.50.....	55 00
" " Proceedings.....	29 70
" " Badges and Bars.....	107 20
" " National Formulary.....	247 78
" Dr. Enno Sander, for Prize.....	50 00
" Account of Ebert Fund.....	28 00
" Committee of Arrangements for Mackinac Island Meeting...	40 60
" Interest on Deposit in New England Trust Co., Boston.....	100 08
" German Fire Insurance Co. for Index MSS. destroyed by fire at Baltimore.....	416 67
" Rebate on Insurance Premium	5 00
" Annual Dues, 1900.....	\$5 00
" " " 1901.....	125 00
" " " 1902.....	235 00
" " " 1903.....	3,380 00
" " " 1904.....	2,790 00
" " " 1905.....	5 00
	<hr/>
Received from Life Membership Fees, viz. :	6,540 00
Thomas J. Jamieson	\$50 00
Olaf M. Oleson	30 00
James M. Good.....	20 00
August H. Vordick.....	20 00
	<hr/>
	120 00
Total.....	\$11,662 06

DISBURSEMENTS.

1903.	
August	8. Check 1005. Nixon-Jones Printing Co., Printing and Stationery
	12 40
	8. Check 1006. Wickersham Printing Co.—
	Insurance
	\$6 88
	National Formulary
	12 75
	<hr/>
	19 63
	8. Check 1007. C. H. Buck & Co., Printing and Stationery ..
	84 30
	8. Check 1008. F. C. Davis & Sons, Section on Practical Pharmacy and Dispensing
	21 75
	8. Check 1009. Nixon-Jones Printing Co., Printing and Stationery
	12 75

August	29.	Check 1010. Wickersham Printing Co., Proceedings	\$95 92
	29.	Check 1011. Eugene G. Eberle, Committee on Drug Habit	20 00
	29.	Check 1012. Wickersham Printing Co.—	
		Proceedings	\$27 05
		National Formulary	8 95
		Miscellaneous Expenses	30 41
			66 41
	29.	Check 1013. William Mittelbach, Committee on Membership	21 72
	29.	Check 1014. Nixon-Jones Printing Co., Printing and Stationery	13 25
	29.	Check 1015. H. M. Whelpley—	
September		Printing and Stationery	\$3 80
		Miscellaneous Expenses	9 90
			13 70
	29.	Check 1016. George F. Payne, Incidental Expenses while President	84 95
	2.	Check 1017. John S. Bridges & Co., Printing and Stationery	17 00
	2.	Check 1018. Wickersham Printing Co., Proceedings	33 75
	5.	Check 1019. Charles Caspari, Jr.—	
		Proceedings	\$12 80
		National Formulary	1 05
		Badges and Bars	28 00
		Miscellaneous Expenses	3 80
		Semi-Centennial Index	148 20
		Traveling Expenses	86 05
			279 90
	5.	Check 1020. Nixon-Jones Printing Co., Printing and Stationery	22 90
	19.	Check 1021. Harry B. Mason, Section on Education and Legislation	5 10
	19.	Check 1022. J. G. McLean, Stenographer	200 00
	19.	Check 1023. Nixon-Jones Printing Co., Printing and Stationery	11 50
	28.	Check 1024. John S. Bridges & Co., Printing and Stationery	14 99
	28.	Check 1025. J. W. T. Knox, Section on Education and Legislation	4 78
	28.	Check 1026. Nixon-Jones Printing Co., Printing and Stationery	3 75
	28.	Check 1027. L. W. Famulener and A. B. Lyons, Hermann Hager Prize	50 00
	28.	Check 1028. Harry M. Gordin, First General Prize	50 00
October	28.	Check 1029. S. A. D. Sheppard, Treas., To purchase exchange on Frankfort, Germany, for account of Dr. Edward Schaer, of Strassburg, Germany, winner of Second General Prize	30 00
	28.	Check 1030. J. O. Schlotterbeck, Third General Prize	20 00
	3.	Check 1031. S. A. D. Sheppard, Treasurer, to purchase exchange on London for account of P. E. F. Pérrédes, of London, Eng., winner of the John M. Maisch Prize	50 00

October	5.	Check 1032. S. A. D. Sheppard, Treasurer, to purchase exchange on London for account of Dr. Frederick B. Power, of London, England, winner of the Ebert Prize.....	\$28 00
	6.	Check 1033. S. A. D. Sheppard, Traveling Expenses.....	62 50
	15.	Check 1034. Nixon-Jones Printing Co., Printing and Stationery	6 75
	15.	Check 1035. John S. Bridges & Co.— Section on Commercial Interests	\$3 55
		Section on Scientific Papers.....	3 42
		Section on Education and Legislation.....	3 64
		Section on Practical Pharmacy.....	3 55
		—————	14 16
	15.	Check 1036. James H. Beal, Section on Education and Legislation.....	5 30
		—————	
November	9.	Check 1037. John S. Bridges & Co., Miscellaneous Expenses	3 50
	9.	Check 1038. Minnie E. L. Faul, Semi-Centennial Index..	14 90
	9.	Check 1039. Ellen M. Jamison, Semi-Centennial Index...	21 25
	9.	Check 1040. J. O. Schlotterbeck, Section on Scientific Papers.....	4 10
	9.	Check 1041. Nixon-Jones Printing Co., Printing and Stationery	21 45
	27.	Check 1042. John S. Bridges & Co.— Committee on Historical Pharmacy	\$10 00
		Printing and Stationery	28 21
		—————	38 21
	27.	Check 1043. Wickersham Printing Co.— Section on Scientific Papers	\$15 00
		Section on Education and Legislation	6 50
December		Miscellaneous Expenses	7 43
		—————	28 93
	27.	Check 1044. Nixon-Jones Printing Co., Committee on Membership	12 40
	19.	Check 1045. Nixon-Jones Printing Co., Committee on Membership	6 49
	19.	Check 1046. Baltimore-Maryland Eng. Co., Proceedings..	8 50
	19.	Check 1047. H. M. Whelpley— First half-year's salary as Secretary of Council, 1903-1904	\$75 00
		First half-year's salary as Secretary of Committee on Membership, 1903-1904.....	75 00
		—————	150 00
	19.	Check 1048. S. A. D. Sheppard, first half-year's salary as Treasurer, 1903-1904	375 00
	19.	Check 1049. Charles Caspari, Jr., first half-year's salary as General Secretary, 1903-1904.....	500 00
1904.			
January	20.	Check 1050. William Mittelbach, Committee on Membership	16 15
	20.	Check 1051. The Mengies Pharmacies, Committee on Historical Pharmacy.....	19 61

January	20.	Check 1052. Wickersham Printing Co.—		
		Proceedings	\$11 01	
		National Formulary	4 83	
		Miscellaneous Expenses	39	16 23
	20.	Check 1053. Nixon-Jones Printing Co., Printing and Stationery		6 75
	20.	Check 1054. H. M. Whelpley, Miscellaneous Expenses ..		13 35
February	2.	Check 1055. John S. Bridges & Co.—		
		Section on Commercial Interests	\$4 39	
		Printing and Stationery	4 00	8 39
	2.	Check 1056. Baltimore-Maryland Eng. Co., Proceedings ..		12 30
	2.	Check 1057. S. A. D. Sheppard & Co.—		
		Printing and Stationery	\$22 86	
		Miscellaneous Expenses	44 16	67 02
	23.	Check 1058. C. H. Buck & Co., Printing and Stationery ..		46 80
	23.	Check 1059. Wickersham Printing Co.—		
		National Formulary	\$39 00	
		Proceedings	14 00	53 00
	23.	Check 1060. Baltimore-Maryland Eng. Co., Proceedings ..		23 06
	23.	Check 1061. C. Lewis Diehl, first half-year's salary as Reporter on Progress of Pharmacy, 1903-1904		375 00
	23.	Check 1062. Nixon-Jones Printing Co., Committee on Membership		12 44
March	2.	Check 1063. Nixon-Jones Printing Co., Committee on Membership		12 40
	2.	Check 1064. Charles Caspari, Jr.—		
		Insurance	\$10 00	
		Journals	43 66	
		Semi-Centennial Index	52 50	
		Proceedings	12 21	
		National Formulary	2 48	
		Miscellaneous Expenses	22 10	142 95
	11.	Check 1065. American Bonding Company, Premium on Treasurer's Bond		12 50
	31.	Check 1066. German Fire Insurance Co.—Rebate on MS. found not to have been destroyed, February, 1904		75 00
April	13.	Check 1067. John S. Bridges & Co.—		
		Printing and Stationery	\$4 00	
		Section on Education and Legislation	2 75	6 75
	13.	Check 1068. Nixon-Jones Printing Co.—		
		Printing and Stationery	\$1 75	
		Committee on Membership	5 31	7 06
May	17.	Check 1069. Wickersham Printing Co.—		
		Proceedings	\$2307 90	
		National Formulary	2 48	
		Miscellaneous Expenses	91	2311 29

REPORT OF THE TREASURER.

33

June	28.	Check 1070. Wickersham Printing Co., Proceedings.....	\$711 63	
	13.	Check 1071. C. Lewis Diehl, Second half-year's salary as Reporter on Progress of Pharmacy, 1903-1904	375 00	
	13.	Check 1072. S. A. D. Sheppard, Second half-year's salary as Treasurer, 1903-1904.....	375 00	
	13.	Check 1073. Henry M. Whelpley— Second half-year's salary as Secretary of Council, 1903-1904	\$75 00	
		Second half-year's salary as Secretary of Committee on Membership, 1903-1904.....	75 00	
				150 00
	13.	Check 1074. Charles Caspari, Jr., Second half-year's salary as General Secretary, 1903-1904	500 00	
	17.	Check 1075. Henry Briele, Gold Badges and Bars	65 45	
	17.	Check 1076. C. H. Buck & Co., Printing and Stationery ..	27 00	
		Check 1077. U. Holzer, Printing and Stationery.....	1 95	
		Check 1078. Charles A. Rapelye, Special Appropriation for Committee on Finance.....	20 20	
	18.	Check 1079. Nixon-Jones Printing Co., Committee on Membership.....	6 25	
	27.	Check 1080. Charles Caspari, Jr.— Proceedings	\$4 68	
		National Formulary.....	85	
		Printing and Stationery.....	1 61	
		Miscellaneous Expenses.....	77 84	
				84 98
				<u>\$8117 40</u>
1903.				
September	3.	Life-Membership Fund, Thomas N. Jamieson.....	\$50 00	
December	28.	" " Olaf M. Oleson.....	30 00	
1904.				
May	26.	" " James M. Good.....	20 00	
		" " August H. Vordick.....	20 00	
				120 00
				<u>\$8,237 40</u>

SUMMARY OF DISBURSEMENTS, JULY 1, 1903, TO JULY 1, 1904.

Proceedings.....	\$3,274 81
Stenographer	200 00
Journals for the Reporter on the Progress of Pharmacy.....	43 66
Semi-Centennial Index.....	236 85
Salaries	2,800 00
Premium on Treasurer's Bond.....	12 50
Traveling Expenses.....	148 55
Section on Practical Pharmacy and Dispensing	25 30
" Education and Legislation.....	28 07
" Commercial Interests	7 94
" Scientific Papers.....	22 52
Committee on Membership.....	93 16
" Drug Habit	20 00
" Historical Pharmacy.....	29 61
" Finance	20 20
Printing and Stationery.....	369 77

Insurance.....	\$16 88
Badges and Bars.....	93 45
General Prizes.....	100 00
Hermann Hager Prize	50 00
John M. Maisch Prize.....	50 00
George F. Payne, incidental expenses while President.....	84 95
Miscellaneous Expenses	213 79
Life-Membership Fund.....	120 00
National Formulary	72 39
Insurance rebate on MSS. found not to have been destroyed.....	75 00
Ebert Prize.....	28 00
<hr/>	
Total amount of disbursements.....	\$8,237 40
Cash on hand July 1, 1904.....	3,424 66
<hr/>	
Total.....	\$11,662 06

APPROPRIATIONS AND EXPENDITURES, UNDER SAME, FOR THE FISCAL YEAR, JULY 1, 1903,
TO JULY 1, 1904.

	Appropriations.	Expenditures.
Salaries.....	\$2,800 00	\$2,800 00
Proceedings	3,325 00	3,274 81
Miscellaneous Expenses.....	250 00	213 79
Printing and Stationery	400 00	369 77
Prizes	200 00	200 00
Traveling Expenses	200 00	148 55
Stenographer.....	200 00	200 00
Badges and Bars.....	110 00	93 45
Journals for Reporter on Progress of Pharmacy.. ..	50 00	43 66
Section on Scientific Papers.....	25 00	22 52
Section on Education and Legislation.....	28 07	28 07
Section on Commercial Interests.....	25 00	7 94
Section on Practical Pharmacy and Dispensing	45 00	25 30
Committee on Transportation.....	25 00	
Committee on Membership.....	125 00	93 16
Committee on Historical Pharmacy.....	50 00	29 61
Committee on Drug Habit.....	20 00	20 00
Committee on Finance	20 20	20 20
Insurance.....	20 00	16 88
Premium on Treasurer's Bond.....	12 50	12 50
Compiling Semi Centennial Index.....	239 04	236 85
George F. Payne, for Incidental Expenses	84 95	84 95
Unexpended Balance		312 75
<hr/>		
	\$8,254 76	\$8,254 76

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the annual meeting, and also from members whose residence is unknown, there was outstanding on the books of the Association, July 1, 1904:

Annual Dues for 1903.....	\$750 00
Annual Dues for 1904.....	3,910 00

\$4,660 00

Respectfully submitted,

S. A. D. SHEPPARD, *Treasurer.*

The Association last year directed the Treasurer "to add to his customary report such explanatory statements as will not only show whether a cash balance exists or not, but which will present clearly the fact, whether or not the Association's business has been conducted with a profit or a loss, during the fiscal year covered by the report."

The following statements are made in response to this instruction of the Association :

The cash on hand at the end of the fiscal year was \$3,424.66. Of this amount, \$341.67 was money received from the insurance company for manuscript of the Semi-Centennial Index destroyed in the Baltimore fire; which money will, of course, have to be paid out to replace work previously done.

\$2,795.00 was received for advance dues, and properly belongs to the coming fiscal year. \$50.00 was money received from Dr. Enno Sander for a prize which has not yet been awarded.

Deducting these amounts from the cash on hand, there remains a net cash balance of \$237.99.

The Association's business, so far as relates to current receipts and expenses, has been conducted, during the fiscal year covered by the report, at a loss of \$1,044.04.

This is shown by the excess of expenses over receipts when advance payments for dues, at the beginning and end of the year, are equalized.

The expenses for the year were \$8,014.40. The receipts were \$7,215.36. But the advance payments for dues, at the end of the year, were \$245.00 more than at the beginning, so that amount should be deducted from the receipts, leaving \$6,970.36, thus showing the deficit named above \$1,044.04.

The same deficit is also shown in another way, namely; by the difference in the net cash balances at the beginning and end of the year.

The cash on hand at the beginning of the year was \$3,832.03. Of this amount \$2,550.00 was received for advance dues, leaving a net cash balance, at the beginning of the year, of \$2,282.03. The net cash balance at the end of the year, as stated before, was \$237.99. The difference is the deficit, \$1,044.04.

While there has thus been a deficit in the treasury cash, the Procter, Centennial and Ebert Funds have increased in value: the Procter Fund, \$557.81; the Centennial Fund, \$66.33; the Ebert Fund, \$6.38: total increase in the value of the three funds, \$630.52.

Therefore, when we consider the treasury cash and also the above-named funds, the Association is shown to be \$413.52 poorer at the end of the fiscal year, just closed, than it was at the beginning.

The value of the Ebert Fund, June 30, 1904, was \$885.60; the Centennial Fund, \$1,954.98; the Procter Fund, \$14,571.83. Total value of the funds, June 30, 1904, \$17,412.41.

The above statements give, in direct and simple terms, the facts asked for by the vote of the Association last year.

Respectfully submitted,

S. A. D. SHEPPARD,

Treasurer American Pharmaceutical Association.

On motion of Mr. Claus, the report just read was ordered received and filed for publication.

The report of the General Secretary was called for, and Mr. Caspari made his report as follows :

REPORT OF THE FINANCIAL ACCOUNTS IN THE CARE OF THE GENERAL SECRETARY.

A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF NATIONAL FORMULARY, FROM JULY 1, 1903, to JUNE 30, 1904.

I. Receipts.

From Sales and Payment of Bills due July 1, 1903..... \$247 78

II. Expenditures.

Paper and Press-Work, 250 copies National Formulary	\$22 50	
Binding 150 copies National Formulary in cloth, @ 11 cts.	16 50	
“ 400 “ Physicians' Epitome, N. F., @ 4¼ cts.	18 00	
Imprinting cover of Physicians' Epitome	1 50	
Expressage and Postage (National Formulary)	12 84	
“ “ “ (Physicians' Epitome)	1 05	
		<hr/> \$72 39

III. Remittances.

To Treasurer, as per Treasurer's Receipts..... \$247 78

IV. Sales.

To dealers and individuals, as per ledger accounts:

National Formulary	\$244 05	
Physicians' Epitome	12 15	
		<hr/> \$256 20

V. Accounts Unpaid.

By dealers..... \$21 44

VI. Bills Due by the Association.

All bills due have been paid.

VII. Stock on Hand.

Copies in flat sheets (unbound)	90	
“ bound in cloth.....	92	
“ “ “ interleaved	4	
“ “ in sheep	1	
“ “ “ interleaved....	0	
		<hr/> 187

B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF NATIONAL FORMULARY SINCE 1888.

Receipts to June 30, 1903 (see Proc., Vol. 51, p. 77).....	\$12,894 80	
Receipts from July 1, 1903, to June 30, 1904	247 78	
		<hr/> \$13,142 58
Expenses to June 30, 1903 (see Proc., Vol. 51, p. 78)	\$7,630 03	
Expenses from July 1, 1903, to June 30, 1904.....	72 39	
		<hr/> \$7,702 42
Total Receipts from Sale of Physicians' Epitome from June 1, 1900, to June 30, 1904	\$498 92	
Total Expenses on Account of Physicians' Epitome from June 1, 1900, to June 30, 1904	623 20	

C. SALE OF PROCEEDINGS.

Receipts from July 1, 1903, to June 30, 1904..	\$39 70
Remitted to Treasurer, as per Treasurer's Receipts.....	39 70

D. ACCOUNT OF BADGES AND BARS.

On hand July 1, 1903 (see Proc., Vol. 51, p. 78)	Badges 28, Bars 98	
Received Aug. 5, 1903, from Henry Briele, Mfr.	" 0 " 40	
Received June 7, 1904, from Henry Briele, Mfr.	" 35 " 0	
	<hr/>	
	63	138
Badges sold from July 1, 1903, to June 30, 1904, 35 @ \$2.00.....	\$70 00	
Bars sold from July 1, 1903, to June 30, 1904, 48 @ 75 cts....	\$36 00	
	2 @ 60 cts....	1 20 37 20
	<hr/>	\$107 20
Remitted to Treasurer, as per Treasurer's Receipts.....		107 20
Balance on hand July 1, 1904	Badges 28, Bars 88	
Receipts from Sale of Badges and Bars to June 30, 1903 (see Proc., Vol. 51, p. 78).....		\$983 35
Receipts from July 1, 1903, to June 30, 1904.....		107 20
	<hr/>	\$1,090 55
Total Cost of Badges and Bars to June 30, 1903 (see Proc., Vol. 51, p. 78)		\$972 60
Cost of 40 Bars received August 5, 1903.....		28 00
Cost of 35 Badges received June 7, 1904.....		64 75
	<hr/>	\$1,065 35

CHAS. CASPARI, JR., *General Secretary.**Baltimore, July 1, 1904.*

Mr. Bernstein moved to receive and print, and the motion was seconded by Mr. Claus and carried.

The Chair announced as the next order of business reports of committees, and said the Secretary would call for them in the order given in the Proceedings.

The Secretary called for the report of the Committee on Revision of U. S. Pharmacopœia, and Chairman F. S. Hereth produced the report and started to read it, when Mr. Koch, of Pittsburg, moved to refer to the Section on Scientific Papers, but upon objection by Mr. Ebert and explanation by the chairman of the committee that it was not a scientific paper and did not belong in that Section, he withdrew his motion, and Mr. Hereth presented the report as follows :

REPORT OF COMMITTEE ON REVISION OF THE UNITED STATES
PHARMACOPŒIA.*To the Officers and Members of the American Pharmaceutical Association :*

Your Committee on Revision of the Pharmacopœia respectfully submits the following report :

It is the opinion of this committee that it would be inadvisable at this time to attempt to offer any suggestion relative to any specific alterations or additions to the Pharmacopœia, using the edition of the Revision of 1890 as a basis, since the new Pharmacopœia will soon be in our hands, and the committee has no information relative to the changes made by the National Committee.

Some general suggestions and thoughts will be made however, for consideration by the Association.

First of all, it appears to us that the title of this committee, which is authorized by the By-Laws, is, in a certain sense, inappropriate, since it has no power to make any changes in the Pharmacopœia, but only to suggest to the Association such changes as in its opinion seem to be advisable. We realize, however, that any suggestions made probably would be made effective if approved of by the Association and conveyed to the National Committee with a request to incorporate in the Pharmacopœia. Moreover, the title of "Committee on Revision of the United States Pharmacopœia" belongs to the committee elected by the National Convention, and it is the National Committee only that has the power to act, and whose duty it is to make the necessary changes in and to publish the Pharmacopœia.

We suggest a change in the name of this committee, and recommend that it be called "The Committee on the United States Pharmacopœia," or that some other name be adopted that would be more in harmony with its actual function.

We find the duties of this committee outlined in Chapter IX, Article 9 of the By-Laws of the Association, and quote as follows: "The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis to the report to be presented by this Association to the National Committee for Revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or alterations in the Pharmacopœia. It shall also note errors of any kind found in the Pharmacopœia so as to facilitate and aid the work of the National Committee on Revision of the United States Pharmacopœia."

If the National Committee desires assistance of this nature, this Committee will no doubt be glad to make suggestions as it thought advisable, but its usefulness would be enhanced many-fold if the National Committee would furnish it with copies of its proceedings, so it could keep posted as to the work being done. We believe, however, that in order to be of any real assistance, this committee should be appointed for a term of ten years, this appointment to be made the same year that the National Committee is elected. It may be a question as to the advisability of appointing the entire committee for a term of ten years, but we believe that the chairman, at least, should be appointed for this period, and it may be deemed best after consideration, that the balance of the members serve for eight, six, four and two years, respectively. If this recommendation is adopted by the Association, it might also be well to have the members of the committee elected rather than appointed. This would enable the committee to undertake work systematically, and would prevent the repetition of recommendations by different committees from year to year. Moreover, to carry out literally the present duties outlined by the By-Laws, some funds would be required, which provision, we believe, has not been made heretofore.

We are aware that this committee has had but one chairman for a number of years, but he has been appointed from year to year, without any assurance of the length of his tenure of office, and has, therefore, not been able to systematically lay out any method of procedure that might be carried out by his successors.

If this committee were furnished, as suggested, with the proceedings of the National Committee, another advantage would be obtained by the knowledge gained by this report; for it will readily be seen that as soon as the new Pharmacopœia is in our hands, discussions will immediately arise relative to changes, additions and alterations, and it might not be inappropriate for this committee to present to the Association a statement as to the changes made, and where deemed best give the reasons therefor.

We feel disposed, however, to go even further, and recommend that this Association request the National Committee on Revision to furnish an abstract of its proceedings to

the pharmaceutical and medical press, since it would be to the greatest interest and advantage to the pharmaceutical and medical professions to have had matters under consideration discussed for two or three years previous to their adoption by the committee. This question has no doubt been discussed by the National Committee, but a recommendation from this Association relative to this proposition would certainly have a great deal of weight. If, however, this proposition does not meet with favor, we recommend that the proceedings be furnished to the chief manufacturers of chemical and pharmaceutical products in the United States, since we believe that the manufacturers of these lines of goods could be of great service to the committee if they were furnished with such reports. There is no doubt but that the National Committee has availed itself freely of some information that was freely given them by some manufacturers at their request, but we believe that this procedure should result in additional advantage to the committee.

Information has been received relative to some changes in the strength of active galenical preparations of the Pharmacopœia. We note especially that of tincture of aconite which is reduced from thirty-five to ten per cent. in strength. The greatest publicity relative to such changes as this should be taken advantage of by informing the pharmacists and physicians of the United States relative to these radical changes. It would be advisable, if it could be accomplished by any means, to put this information into the hands of every physician and pharmacist in the United States. After the Pharmacopœia of 1900 becomes effective, the pharmacist will not know, unless the physician specifies, whether tincture of aconite U. S. P. 1890 or 1900 is intended, and may frequently have to judge what is wanted from the size of the dose prescribed. Nearly all of the States now have pharmacy laws, and registers of pharmacists are available through Boards of Pharmacy. The State Boards of Health could furnish a comparatively complete register of physicians. Some advantage should be taken of this fact in spreading broadcast all information relative to changes that are likely to cause serious results, as well as other matters of importance.

The pharmacopœial methods are generally admirably adapted to the manufacture of preparations in the quantities specified. It is, however, of great interest to manufacturers of pharmaceuticals on a large scale to know how far they may depart from pharmacopœial methods and standards without censure. This may also apply in many instances to the dispensing pharmacist. For example: Fluid extract of cinchona is made from cinchona of the required alkaloidal strength. If the finished fluid extract represents the drug, why should not the tincture be made by diluting the fluid extract? The resulting tincture is certainly U. S. P. in strength although it was not made by the U. S. P. method. Moreover, if the tincture may be made in this manner, the pharmacist need carry in stock only the fluid extract. If the fluid extract, the tincture and the solid extract are made with the same menstruum, the pharmacist may make or purchase the fluid extract and he will then be prepared to furnish all other preparations of the drug.

Note that fluid extract of krameria, U. S. P., 1890, is made by exhausting the drug with a mixture of diluted alcohol and glycerin. If the manufacturer finds that by exhausting the drug with diluted alcohol and adding the glycerin to the finished percolate, he obtains a preparation that is more permanent than when made by the U. S. P. method, is he justified in making this change and labeling his product U. S. P.? Tincture of opium U. S. P. is made by percolating powdered opium with diluted alcohol. It is known that water exhausts opium perfectly. May a manufacturer exhaust opium with water, reduce it and add sufficient alcohol to bring it to the required alcoholic strength and finish a tincture of standard strength as to morphine and then label it U. S. P.? It certainly will contain all the medicinal qualities required of tincture of opium, the same amount of alcohol and the same percentage of morphine. Is it not, therefore, a strictly U. S. P. article?

Again, if a manufacturer making a fluid extract from a drug containing an alkaloid finds that 60 per cent. alcohol will exhaust the drug better than 50 per cent. alcohol, the official menstruum, is he justified in labeling the resulting fluid extract U. S. P. if it is of proper strength as regards alkaloidal content?

Many manufacturers in the United States have adopted certain alkaloidal standards for some fluid extracts, for the assay of which no standard has been adopted by the Pharmacopœia but which these manufacturers have found to give products of great uniformity. Since crude drugs vary greatly in alkaloidal strength, will these manufacturers be justified in labeling a fluid extract U. S. P. if $1\frac{1}{2}$ grammes of drug are required to make a cubic centimeter of fluid extract of standard alkaloidal strength, or if he uses $\frac{3}{4}$ of a gramme of a drug of extra quality for making one centimeter of fluid extract? Some drugs, for instance pilocarpus and belladonna, vary so greatly in alkaloidal strength and color that the specific gravity of the finished fluid extract will also vary greatly on account of the smaller or larger amount of drug required to make the fluid extract. Would it not be advisable, in order to obviate this, that the fluid extract be directed to be made from a drug of approximately standard strength produced by mixing the stronger with the weaker drug? Sometimes, however, this is not practicable since high-grade drugs cannot always be obtained and an increased amount of an inferior drug must necessarily be used. Again, if an extract of belladonna be made and it be found to be 25 per cent. greater in alkaloidal strength than it should be to correspond with the requirements of the Pharmacopœia, is the manufacturer justified in diluting it with anything except an extract of the same drug of inferior strength?

It occurs to us that some lines of goods that have proved by many years of experience to be popular and efficient should be added to the Pharmacopœia, but we hesitate to make suggestions relative to them since the reasons for their being barred from the Pharmacopœia may have already been thoroughly canvassed by the National Committee. As an instance, we cite hypodermic tablets, powdered extracts and elastic capsules.

It is the opinion of at least a part of this committee that the Pharmacopœia should embrace some of the preparations that are now relegated to the National Formulary. We are aware also that this subject has received full consideration by the National Committee. We believe, however, that any criticism of the Pharmacopœia in this respect would be entirely invalidated and the popularization of the National Formulary would be very quickly and readily accomplished by publishing it at the same time the Pharmacopœia is published, and binding it within its covers as an addition or appendix. This would place the National Formulary in the hands of every pharmacist and physician who purchased a Pharmacopœia, and would tend not only to popularize the National Formulary, but the Pharmacopœia itself.

Since writing the above an additional suggestion has been made by one of the members of this Committee, namely, that the National Committee on Revision of the United States Pharmacopœia include a number of manufacturers who would vouch under their names for the correctness of practical questions pertaining to the manufacture of chemicals and drugs. By so doing the revisors would receive information in regard to many practical questions whereby the Pharmacopœia would be greatly improved.

Respectfully submitted,

FRANK S. HERETH, *Chairman*,
F. W. FRERICHS,
D. M. R. CULBRETH,
J. L. HOPKINS.

The report was greeted with applause, and Mr. Beringer moved to receive and take up the recommendations *seriatim*, and the motion prevailed.

Mr. Hereth read the first recommendation, that the name of the committee be changed, and that it be called the Committee on United States Pharmacopœia, or some other name more appropriate than the present one. Mr. Beringer, seconded by Mr. Eliel, moved that the title be changed to that of the Committee on United States Pharmacopœia. After a short discussion between Messrs. Good, Ebert and Beringer, as to the effect of this proposed change upon the By-Laws and the proper method of procedure, the recommendation was passed without action.

Mr. Hereth read the second recommendation of the committee, that the National Committee on Revision be requested to furnish a copy of its proceedings to this Association, or to its Committee on Revision. Mr. Ebert, seconded by Mr. Sheppard, moved to approve. Mr. Hereth called attention to the recommendation further along in the report that the Association request the National Committee on Revision to furnish a copy of its proceedings to the pharmaceutical and medical press, and said if this were adopted the other recommendation would not be necessary, as the Association would get the information desired in that way. Mr. Mayo said he thought it would be just as well to adopt the recommendation *seriatim*, as they came in the report, and the Board of Trustees would adopt them or turn them down, as they pleased. Thereupon the motion of Mr. Ebert to adopt the second recommendation was put and carried.

Mr. Hereth read the third recommendation, that the committee be appointed for a term of ten years, or at least that the chairman of this committee be appointed or elected for a term of ten years, and the balance of the committee for terms of eight, six, four and two years, respectively. This proposition precipitated a prolonged discussion, developing much contrariety of view, as to how the committee should be constituted, the terms of its members, and how and by whom to be appointed, and was participated in by Messrs. Eliel, Mayo, Dohme, Beringer, Caspari, Jr., Puckner, Candidus, Kremers, Hereth, Good, Hallberg, Ford, Roehrig, Hynson, Wescott, Ebert, Hopp and others, during which time a number of motions were made and disposed of. A motion by Mr. Kremers, offered as a substitute to a motion by Mr. Dohme, and to the effect that this particular section of the report be referred back to the committee, with request that it give the proposition mature consideration, in the light of the discussion had, and report next year, was lost; also a substitute motion by Mr. Ford, of Denver, that the committee be appointed by the Council. An amendment to Mr. Dohme's motion offered by Mr. Mayo, to the effect that the committee should be elected by the Section on Scientific Papers, which would throw the election of one member each year into the Section, after the organization of the committee, was also lost. The following motion of Mr. Dohme was then adopted amid applause:

Moved by A. R. L. Dohme, seconded by G. M. Beringer, that the President appoint, after consultation with the Chairman of the Revision

Committee of the U. S. P., a Committee on the U. S. Pharmacopœia to replace the former Committee on the Revision of the U. S. P. of this Association, to consist of ten members of this Association, serving terms of 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1 years, with an appointment by the President of one new member each year; said committee to elect its own chairman who shall serve until his successor is elected by the committee; and to offer its services to the Chairman of the U. S. P. Revision Committee for active work on the revision, without, of course, having a vote. It is understood that a member whose term expires may be reappointed.

Mr. Hereth read the fourth recommendation, "that this Association request the National Committee on Revision to furnish a copy of its proceedings to the pharmaceutical and medical press." Mr. Gane, of New York, moved to adopt. Mr. Dohme asked for an explanation of the word "copy," and Mr. Hereth said the work as it progressed—the order of proceedings, the recommendations and the discussions. Mr. Dohme thought this would not be acceptable to the National Revision Committee, which reserved the right to dispose of its own work. Mr. Beringer suggested the substitution of the word "abstract," and Mr. Hereth accepted the amendment, after stating that the object was that everybody might become familiarized with the work the National Committee was doing, and that pharmacists and physicians might become familiar with the work about to be issued. The motion to adopt, as amended, was then put and carried.

Mr. Hereth stated that, not knowing whether the last recommendation would be accepted or not, the next (5th) recommendation was, that an abstract of such proceedings be furnished the manufacturers of pharmaceutical and chemical preparations. Secretary Caspari expressed his doubts as to the advisability of multiplied requests of this character of the National Committee, and made a plea that it should not be overloaded with requests and suggestions. Thereupon the Chair put the vote on the adoption of this clause of the committee's report, and it was lost.

Mr. Hereth read the sixth recommendation, in regard to giving publicity to the changes that are to occur in the Pharmacopœia, and Mr. Mayo moved to transmit to the National Committee, without comment, and the motion prevailed.

Mr. Hereth said the next suggestion was not a recommendation, but had reference to the question as to what are U. S. P. preparations. Mr. Hallberg moved to refer the balance of the report to the Committee on Scientific Papers. Mr. Beringer objected to this, as having already been voted down, and Mr. Eliel thought that the following recommendation, that the National Formulary should be bound in with the new Pharmacopœia when issued, should be considered not by the Scientific Section, but by the Association in general session. The Chair asked Mr. Hereth to state the last recommendation, and he read the whole of the last para-

graph but one of the report. Mr. Beringer moved that that portion of the report be not approved, and the motion was seconded by Mr. Good and carried.

Mr. Hereth then read from the last paragraph of the report the suggestion of one of the members of the committee that the National Committee on Revision should include a number of manufacturers, who would vouch under their names for the correctness of practical questions pertaining to the manufacture of chemicals and drugs. Mr. Mayo moved that the suggestion be not approved, and the motion was seconded by Mr. Koch and carried.

Mr. Beringer then moved that the report as amended be approved as a whole, and Mr. Cliff seconded the motion and it prevailed.

Mr. Hynson moved that the Secretary be instructed to formulate the necessary changes in the Constitution and By-Laws to make them conform to the suggestions just adopted, that the changes might be made at this meeting of the Association, and the motion was seconded by Mr. Hallberg and carried.

On motion of Mr. Anderson, the Association then adjourned.

THIRD SESSION—TUESDAY AFTERNOON, SEPTEMBER 6, 1904.

No business was transacted by the Association previous to the session of the Section on Commercial Interests.

FOURTH SESSION—TUESDAY EVENING, SEPTEMBER 6, 1904.

No business was transacted previous to the session of the Historical Committee.

FIFTH SESSION—WEDNESDAY MORNING, SEPTEMBER 7, 1904.

No business was transacted previous to the first session of the Section on Pharmaceutical Education and Legislation.

SIXTH SESSION—WEDNESDAY EVENING, SEPTEMBER 7, 1904.

No business was transacted previous to the first session of the Section on Practical Pharmacy and Dispensing.

SEVENTH SESSION—THURSDAY MORNING, SEPTEMBER 8, 1904.

No business was transacted previous to the second session of the Section on Pharmaceutical Education and Legislation.

EIGHTH SESSION—THURSDAY AFTERNOON, SEPTEMBER 8, 1904.

No business was transacted previous to the first session of the Section on Scientific Papers.

NINTH SESSION—FRIDAY MORNING, SEPTEMBER 9, 1904.

No business was transacted previous to the second session of the Section on Scientific Papers.

TENTH SESSION—FRIDAY AFTERNOON, SEPTEMBER 9, 1904.

No business was transacted previous to the second session of the Section on Practical Pharmacy and Dispensing.

ELEVENTH SESSION—FRIDAY EVENING, SEPTEMBER 9, 1904.

The eleventh (and last) general session was convened in the ladies' ordinary of the hotel, at 8 o'clock p. m., with President Hopp in the chair.

The Secretary read the minutes of the second general session held on Tuesday morning. Mr. Beringer suggested that the minutes did not include a motion in form to amend the By-Laws to make them consist with a motion offered by Mr. Dohme and passed at the second session relating to the Committee on U. S. Pharmacopœia. The Secretary explained that this and other proposed amendments to the By-Laws had been drawn in due form and would be presented for action by the Association later in the session. Thereupon, Mr. Roehrig moved to approve the minutes as read, and the motion prevailed.

The chair stated that, through an oversight at the first session, the delegates representing the various branches of the government service were overlooked and not called upon to address the Association, and they would be called on now. The delegates present were Mr. Albert M. Roehrig, Dr. Reid Hunt and Mr. W. H. Miller, from the Public Health and Marine Hospital Service, Mr. T. N. Phillips, from the U. S. Navy, and Mr. Lyman F. Kebler, from the Drug Laboratory of the Agricultural Department.

Mr. Roehrig was the first speaker, who, after expressing his appreciation of the privilege of having again the opportunity to address the Association as the representative of that important arm of the government service, the Public Health and Marine Hospital service, spoke as follows :

Passing through Washington a few days ago, I called at headquarters and had a talk with Surgeon-General Wyman, of this service, and mentioned to him that I thought it would be appreciated by the members of the American Pharmaceutical Association if he would permit me to be the bearer of a message from him. I told him how we, being the first to recognize this Association, would always be held near and dear to all members

who had the real interests of the Association at heart, as well as the general advancement of pharmacy and its allied branches. He desired me to convey to you his sense of pleasure and gratification at the cordial relations existing between the service and this Association. He wished me to assure you, Mr. President and fellow-members, that he was in hearty accord with every act of yours looking to the advancement of pharmacy, chemistry and kindred branches of knowledge and science. As a practical demonstration of this readiness to co-operate with you along these lines, I have but to refer to the result of a resolution passed by this Association at its Mackinac Island meeting a year ago—a resolution introduced by Prof. Sayre, of the University of Kansas—to the effect that this Association requested that the Public Health and Marine Hospital Service would take in charge the matter of establishing a standard for anti-diphtheritic serum for the use and guidance of manufacturers, investigators and all concerned. This resolution only required a small space to record it—only a few lines in our Proceedings—but if you will stop a moment to consider what this means you will be amazed at the great and responsible work you have asked the service to perform. Yet Gen. Wyman immediately placed his hygienic laboratory at work, and at considerable expense to the government, began the labor of establishing this antitoxin unit; and, after months of arduous labor, I am glad to inform you that it is believed that a standard will soon be ready for distribution. It is not safe to say just when, but I believe at a very early day. You must remember that an important undertaking like this requires the greatest care, the most searching investigation, and the employment of every possible test, so as to avoid any complications in the future. All this has been done, and in the most conservative manner; and I was informed a few days ago that the work was near completion. So much for the result of this resolution, which shows the readiness and willingness of Gen. Wyman to co-operate with this Association.

Gen. Wyman also wished me to inform you that in the establishment of a division of pharmacology in the Hygienic Laboratory he has undertaken the testing of drugs. Several hundred specimens have been received from the Purveying division of the service, and many of them have already been investigated. It should be remembered that the government not only supplies the hospital stations of the service in the United States, but those in the far distant possessions we have acquired in recent years. It is not only for our service, but for other government services, that such supplies are furnished, and it behooves us to see that they are of the best quality and the greatest possible purity. The examinations made were not only for the purpose of ascertaining whether these drugs complied with the pharmacopoeial standard, but with the view of ascertaining whether or not the standard itself could not be improved upon. With this object in view I am able to inform you that Gen. Wyman has expressed himself that he would be very happy indeed to render any assistance in his power along these lines, and to co-operate with the American Pharmaceutical Association and the Committee on Revision of the Pharmacopoeia in making any tests desired, and in undertaking any work that would in any way improve or enhance the value of the United States Pharmacopoeia. [Applause.] I mention these facts, my friends, because we have been working more or less in the dark of late years on some of these lines, and this is the opportunity of our lives. It is a proposition we have never received before, and I doubt whether we will ever again have such an offer from such an important and powerful branch of the government service. We are now in accord with the highest standard of authority, one universally recognized and ready at all times to assist us in the standardizing of drugs according to the test of the Pharmacopoeia, and in improving the test itself, and I think this is the time to accept the offer that has been tendered so generously.

Mr. Roehrig closed his remarks by expressing his appreciation of the royal and cordial entertainment features of the meeting, for which the

Association owed its thanks to the pharmacists of Kansas City, and paid a glowing tribute to the untiring and devoted efforts of the ladies of Kansas City to contribute to the happiness and pleasure of the members during the week of the meeting. He received the hearty applause of those present when he had closed.

The chair called on Mr. T. N. Phillips, as a delegate from the United States Naval Service, to address the convention.

Mr. Phillips said he desired to place on record the appreciation of the pharmacists in the Navy for the valuable work the Association had done in their behalf, and he especially desired to make acknowledgement to Dr. George F. Payne for his indefatigable efforts in their behalf. He said the pharmacists in the Navy were beginning to take a lively interest in the Association, and he hoped that in time the Association would have the adherence of every eligible member of the hospital corps.

Dr. Reid Hunt, of the Public Health and Marine Hospital Service, was next invited to say a few words, and he did so. He said he had had the privilege of spending a considerable time in Germany, in the laboratory of Prof. Ehrlich, who set the diphtheria antitoxin standard for the entire world at the present time, and was greatly impressed with the enormous amount of labor involved in such work as was there being conducted—work involving a great deal of labor and the expenditure of many thousands of dollars. He said Gen. Wyman appreciated the compliment of having this Association ask him to undertake this work in America. He touched on the work being essayed by the new division of pharmacology in his arm of the Government Service, and showed how extensive it must be as affecting only the hospital service at the many stations in the United States and its recently acquired possessions beyond the seas, in which some sixty thousand patients annually were treated, and said they hoped to do considerable research work now, and throw some light upon work already done, as well as some that would lead to the discovery of new remedies for restraining disease.

Mr. Miller, of the same service, was next called upon, and briefly thanked the Association for the kindness it had always shown the pharmacists in the Public Health Service, and expressed his pleasure at being able to attend the meeting and make the personal acquaintance of so many of his fellow members.

Mr. Kebler spoke at some length as the representative of the Department of Agriculture, Drug Laboratory Division. He said that the laboratory was much better equipped now than it was a year ago, and they were expecting to do work of considerable value. He did not wish to be understood, however, as saying that they had everything they needed by way of equipment. He referred to certain erroneous statements in the public press in regard to work done in the laboratory, and spoke of analyses made for the Post Office Department of certain injurious and vicious proprietary preparations, resulting in their suppression.

The President said these were encouraging and interesting words from the gentlemen representing various arms of the Government Service, and called on Mr. Good, of St. Louis, to make suitable acknowledgment. Mr. Good did this, in a few appropriate words, thanking the gentlemen for their kind expressions, and saying that the co-operation of the Government was fully appreciated, and its far-reaching influence was beyond measure. He thanked the gentlemen for their presence, and said it was to be hoped the Government would send an equally large delegation in the future.

The report of the Committee on Time and Place of Next Meeting was called for as next in order, and Mr. Hynson, Chairman, said that, unfortunately, the committee could not come to unanimous agreement, and he would present the majority report, which he did, as follows :

Your Committee on Time and Place of Next Meeting respectfully reports that this Association has been honored by cordial invitations to visit Cambridge Springs, Pa., Atlantic City, N. J., Tampa, Florida, Plattsburg, N. Y., Put-in-Bay, Ohio.

After a thorough canvass of the members present and a careful consideration of the subject, being influenced in our conclusions while holding one point in view, namely, the welfare and progress of this dear old Association: We recommend that the next meeting, including a popular but restricted exhibit, be held at Atlantic City, N. J., on the first Monday in September, 1905.

We further recommend that the arrangements and care of both meeting and exhibit be placed in the hands of a special committee composed of: W. C. Wescott, Atlantic City; W. C. Anderson, Greater New York; W. L. Cliffe, Philadelphia; F. C. Henry, Washington; H. P. Hynson, Baltimore.

We also recommend that after the general session on the opening day, the time between 9 a. m. and 11:30 a. m., and 3 p. m. to 6 p. m. every day up to and including the Friday after first Monday in September, be devoted entirely to the business of the Association; that no special entertainments be recognized during the day-time, and that entertainment by local pharmacists be pointedly discouraged.

If it should appear that we have exceeded our province in making this report, we beg pardon, and plead our love for and interest in this Association as excuse.

Obediently,

H. P. HYNSON, *Chairman*,
CHAS. A. RAPELYE,
CASWELL A. MAYO.

Mr. Claus, in presenting a minority report in favor of holding the next annual meeting at Cambridge Springs, Pa., facetiously remarked that yesterday they had a majority, but had lost it since Mr. Hynson had "seen" Mr. Mayo.

Mr. Hynson moved to adopt the majority report, and Mr. Wilbert seconded the motion, speaking to his second. Mr. Claus spoke for the minority report in perfect good temper, and Mr. Hynson responded in like manner for the majority report. Mr. Wright, of Joplin, Mo., favored the minority report. Mr. Beringer called attention to the fact that a favorable vote on the majority report would seem to carry with it the adoption of the committee's recommendation that an exhibit be made at Atlantic

City ; thereupon, Mr. Whelpley moved that the majority report be received and the recommendations taken up *seriatim*, as there were several recommendations in the report out of the ordinary. Mr. Good moved that the report, so far as it applied to time and place of next meeting, be adopted, declaring that everything else in it was out of order and for the Council to consider ; he then proceeded to speak on his motion. Mr. Hynson said the committee would withdraw its recommendations, except as to time and place. The chair put the motion to adopt as to time and place to an aye-and-no vote, and Mr. Claus called for a division, the result showing 43 votes in favor of the motion to adopt, and only about half a dozen against it. Mr. Payne arose to a point of personal privilege, and said that, though in favor of Atlantic City, he had voted against it in order to explain his vote ; that he objected to the first Monday in September, because it interfered with so many of the retail druggists. Mr. Hynson then moved that the other recommendation of the report be referred to the Council, and the motion was seconded by Mr. Good and carried.

The report of the Committee on President's Address was called for, and Mr. Meissner, Chairman, presented the following :

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

To the American Pharmaceutical Association :

Gentlemen : Your Committee on President's Address beg leave to submit the following report :

1st. We concur in the recommendation of the President that the words, "Embodying general scientific facts and events of the year" be stricken out of Article 9, Chapter I, of the By-Laws, which shall then read, "He shall present at each annual meeting an address, or discuss such scientific questions as may to him seem suitable to the occasion."

2d. The recommendation that all receipts be placed into two funds, one to be known as the General Expense Fund, and one as the Section Committee Fund, we heartily approve and recommend the adoption of this plan.

3d. We heartily concur in the recommendation that a Committee on Publicity be appointed, whose special duty shall be to take up the questions involved in the President's recommendation regarding publicity, and report at our next meeting on the feasibility of the adoption of the President's suggestion. We recommend, however, the immediate adoption of the third feature, viz., that the annual announcement be sufficiently enlarged to enable us to set forth the objects of the Association and make a strong appeal to join us in membership, with an invitation to attend our meetings ; such announcements to be sent to all members and to such members of State Associations as the Secretary of such association may advise.

4th. In regard to the establishment of sections in Canada, Cuba, Porto Rico, the Philippines and Hawaii, we recommend that this question be referred to the Committee on Organization of Local Branches.

5th. We recommend the adoption of the Procter certificate of membership, but do not consider it advisable that it should be made obligatory to membership. We would, however, advise that all members be solicited to procure this certificate under the plan proposed in the recommendation of the President.

6th. *Historical Pharmacy :* We concur in the recommendation of the President that a Section on Historical Pharmacy be established. We recommend that the elective

officers of this Section consist of a Chairman, Secretary and Historian, the same to be elected annually, and associates may be added by the officers of the Section.

We further agree with the President in his recommendation that the exhibits should be made of educational value, and we hope that the Historical Section, as soon as organized, will make exhibits of an historical and educational character.

7th. Popularising National Formulary Preparations: We approve the recommendation of the President regarding labels for National Formulary Preparations, and recommend that the matter be referred to the Committee on National Formulary, with instructions to carry out the details.

We concur in the recommendation that a suitable prize be offered for the best exhibit of National Formulary Preparations, competition being limited to the retail pharmacists of the State in which the meeting is held. The control of exhibits and the awarding of the prize to be under the jurisdiction of the Section of Practical Pharmacy and Dispensing.

8th. National Association of Retail Druggists: We heartily concur in the recommendation urging a closer relation with the N. A. R. D. To the improved commercial condition of the retail trade, brought about through the efforts of the N. A. R. D., our greatly increased membership in the last few years is undoubtedly due.

9th. Programme of Sessions: We also approve of the recommendation that the programme of sessions be so arranged that the last three sessions for sections be assigned to the Section on Practical Pharmacy and Dispensing and Commercial Section.

10th. Installation of Officers: We approve of the recommendation of the President regarding the installation of newly-elected officers.

Respectfully submitted,

F. W. MEISSNER, JR.

F. C. GODBOLD,

CHAS. A. RAPELYE.

Mr. Whelpley moved that the report be received, re-read, and each section considered adopted unless objection was made; the motion was seconded by Mr. Candidus and carried.

The Secretary read the first section. Mr. Whelpley said the old rule required the President to review the conditions of pharmacy, scientific and otherwise. Mr. Hereth said he would like to suggest scratching out the word "scientific." No action was taken.

The Secretary read the second section of the report, and Mr. Hynson moved to refer to the Council. Motion seconded by Mr. Good and carried.

The Secretary read the third section. Mr. Good thought the recommendation should simply be referred to the Committee on Publicity, as it was really an outline of the work for that committee. Mr. Meissner briefly explained the committee's reasons for making the recommendation in this shape. Secretary Caspari entered his protest against the recommendation, as he feared it would involve the Association in more expense than benefit. He thought the present form of circular sent out annually, reciting the programme adopted, and giving information as to rates, etc., was all that was needed. Mr. Good thereupon moved that this whole matter, including the appointment of a committee on publicity, be referred to the Council, and the motion had a second in Mr. Kane, and was carried.

The Secretary read the fourth recommendation, and said that a com-

mittee appointed on this very subject last year had failed to report. After a number of motions and counter-motions had been made, Mr. Carter, of Indianapolis, moved that this matter be referred to a committee to be appointed at future time, and the motion was seconded by Mr. Hynson, and carried.

The Secretary read the fifth recommendation. Mr. Hancock opposed the recommendation because there would be a better resolution introduced later on this subject. On motion of Mr. Hynson this section of the report was laid on the table.

The Secretary read the sixth recommendation. Mr. Roehrig thought a vice-chairman should be provided, to preside in the absence of the chairman, but Mr. Whelpley said one of the associates could do that, and the point was not pushed.

The Secretary read the seventh recommendation. Mr. Caspari and Mr. Hynson spoke in opposition to the idea of a uniform label. Mr. Cliffe moved that the recommendation be not concurred in, and the motion was seconded by Mr. Wilbert, and carried.

The Secretary read the eighth recommendation, to which there was no objection made.

The Secretary read the ninth recommendation. No objection.

The Secretary then read the tenth and last recommendation. A lively discussion was at once precipitated by this recommendation, and considerable difference of opinion was developed as to the time and under what conditions the installation of officers should be had. Messrs. Good, Meissner, Mayo, Hopp, Whelpley, Hynson, Payne, Wilbert, Hancock and Dohme participated in the discussion, which resulted in the adoption of a motion made by Mr. Whelpley that the recommendation should not be approved.

Upon motion of Mr. Good, with Mr. Hancock as a second, it was ordered that the recommendations as amended be approved.

The Secretary called attention to the fact that the fifth recommendation had been laid on the table, but, although the chair had invited it, no motion to take from the table was made. Mr. Hynson thought that was a good place for it.

The report of the Committee on General Prizes was called for, and Mr. Chas. E. Caspari, in the absence of Chairman Army, presented the report as follows:

REPORT OF COMMITTEE ON GENERAL PRIZES.

Your committee begs leave to report that after careful consideration of the papers presented at the Fifty-First Annual Meeting, they were unable to find any which, in their opinion, were eligible to either the Maisch or the Hager Prize.

As to the General Prizes, your committee finds itself in the same position as was the committee of 1901-1902 (Proceedings, 1902, page 55), its individual members being unable to choose the three best papers from several totally different branches of science.

In view of the fact that there are several prizes offered to members of the Association for papers on specified lines—the Ebert Prize, the Enno Sander Prize, the John M. Maisch Prize and the Hermann Hager Memorial Prize—your committee recommends that the General Prizes be either abolished or awarded for research in lines other than those covered by the prizes above enumerated—in the words of the committee of 1901-'02, “papers to be classified according to that branch of the science or art of pharmacy which they represent.”

Respectfully submitted,

H. V. ARNY, *Chairman*,
WM. C. ANDERSON,
CHAS. E. CASPARI.

On motion of Mr. Hancock, seconded by Mr. Candidus, the report just read was adopted.

Mr. F. C. Henry then presented the report of the Committee on National Legislation, as follows :

REPORT OF THE COMMITTEE ON NATIONAL LEGISLATION.

To the Officers and Members of the American Pharmaceutical Association :

Your Special Committee on National Legislation respectfully reports that the following bills have been before Congress, in which the drug trade have been interested :

That of the reduction of the present tax on alcohol from \$1.10 to 70 cents per gallon.

The modification of the present patent and trademark law as it relates to medicine.

Then the pure food and drug bill, known as the McCumber Bill.

Nothing has been done regarding the reduction of tax on alcohol, and should this measure come up at the coming session of Congress, your Committee should like to be further instructed.

The following bill was introduced by Representative Mann, of Illinois, based upon the recommendations of the N. A. R. D. Committee and entitled a “Bill Amending the Statutes Relating to Patents.”

“ A BILL

“ AMENDING THE STATUTES RELATING TO PATENTS.

“ Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section forty-eight hundred and eighty-six of the Revised Statutes as amended by Act of Congress approved March third, eighteen hundred and ninety-seven, be, and the same hereby is, amended by adding thereto the following: ‘but no patent shall be granted to a citizen of any foreign country which does not grant a corresponding patent to a citizen of the United States: *And provided further*, That no patent shall be granted upon any drug, medicine, or medicinal chemical except in so far as the same relates to a definite process for the preparation of said drug, medicine, or medicinal chemical,’ so that the section as amended shall read as follows;

“‘ SEC. 4886. Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law and other due proceedings had, obtain a patent therefor; but no patent shall be granted to a citizen of any foreign country which does not grant a corresponding patent to a citizen of the United States: *And provided further*, That no patent shall be granted upon any drug, medicine, or medicinal chemical except in so far as the same relates to a definite process for the preparation of said drug, medicine, or medicinal chemical.’

“ SEC. 2. That section forty-eight hundred and forty-seven of the Revised Statutes as amended by Act of Congress approved March third, eighteen hundred and ninety-seven, and as further amended by Act of Congress approved March third, nineteen hundred and three, be, and the same hereby is, amended by adding thereto the following: ‘*Provided, however*, That in case any drug, medicine, or medicinal chemical on which a patent has been granted is not manufactured in the United States within two years of the

granting of said patent, said patentee shall have no right under the patent laws of the United States as against any citizen of the United States who may import such drug, medicine, or medicinal chemical into the United States,' so that the section so amended shall read as follows:

"Sec. 4847. No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid, by reason of its having been first patented or caused to be patented by the inventor or his legal representative or assigns in a foreign country, unless the application for said foreign patent was filed more than twelve months, in cases within the provisions of section forty-eight hundred and eighty-six of the Revised Statutes, and four months in cases of designs prior to the filing of the application in this country, in which case no patent shall be granted in this country.

"An application for patent for an invention or discovery, or for a design, filed in this country by any person who has previously regularly filed an application for a patent for the same invention, discovery, or design in a foreign country whi.:t, by treaty, convention, or law, affords similar privileges to citizens of the United States shall have the same force and effect as the same application would have if filed in this country on the date on which the application for patent for the same invention, discovery, or design was first filed in such foreign country: *Provided*, The application in this country is filed within twelve months in cases within the provisions of section forty-eight hundred and eighty-six of the Revised Statutes, and within four months in cases of designs, from the earliest date on which any such foreign application was first filed. But no patent shall be granted on an application for patent for an invention or discovery or a design which had been patented or described in a printed publication in this or any foreign country more than two years before the date of the actual filing of the application in this country, or which had been in public use or on sale in this country for more than two years prior to such filing: *Provided, however*, That in case any drug, medicine, or medicinal chemical on which a patent has been granted is not manufactured in the United States within two years of the granting of said patent, said patentee shall have no rights under the patent laws of the United States as against any citizen of the United States who may import such drug, medicine, or medicinal chemical into the United States.'

"Sec. 3. That this law shall take effect — — —; and section one, amending section forty-eight hundred and eighty-six of the Revised Statutes as amended by Act of Congress approved March third, eighteen hundred and ninety-seven, and section two, amending section forty-eight hundred and eighty-seven of the Revised Statutes as amended by Act of Congress approved March third, eighteen hundred and ninety-seven, and as further amended by Act of Congress approved March third, nineteen hundred and three, shall not apply to any patent granted prior to said date, nor to any application filed prior to said date, nor to any patent granted on such application."

This bill was referred to the House Committee on Patents, and after a full hearing was favorably reported. The bill is now pending in the House, and favorable action upon it is hoped at the coming session, and we should do everything in our power to aid in securing the passage of this bill, as the proposed changes in the law are but reasonable and proper.

Then comes the pure food and drug bill.

This bill was offered in the Senate by Senator McCumber as a substitute for the House bill that passed the last Congress.

The drug features correspond in all respects with the drug features of the House bill, except that the definition of the term "drug" was enlarged so as to read: "also any substance intended to be used for the cure, mitigation, or prevention of disease."

Your Committee joined representatives from the National Wholesale Druggists' Association, National Association of Retail Druggists, and Proprietary Association, and appeared before the Committee of Manufactures of the Senate, of which Senator Heyburn was Chairman, and vigorously protested against this change from what it was in the original bill that was endorsed by our Association.

Your Committee filed the following petition:

"WASHINGTON, D. C., *January 19, 1904.*

"HON. W. B. HEYBURN. *Chairman Committee on Manufactures:*

"*Dear Sir:* Your petitioners, the Committee on National Legislation of the American Pharmaceutical Association, respectfully desire to call your attention to Senate bill 198, presented by Senator McCumber, which is a great and radical departure, so far as drugs are concerned, from the bill of former years, which was approved by our Association, which bill limited the definition of the word drug to medicines and preparations recognized in the United States Pharmacopoeia for internal and external use; but in Senate bill 198 this definition is enlarged by adding the following words:

"Also any substance to be used for the cure, mitigation, or prevention of disease."

"After thus enlarging the definition of drugs, the bill further provides that a drug shall be deemed to be adulterated if its strength or purity fall below the professed standard under which it is sold.

"Now, as applied to preparations recognized in the United States Pharmacopœia, where standards are fixed, this is exactly right, and is a provision possible of enforcement, but as applied to tens of thousands of other articles not defined in the Pharmacopœia for the treatment of diseases, this provision would give rise to countless troubles.

"The Committee respectfully petition that the said bill may be amended by the elimination of said clause, thereby restoring the definition of the term 'drug,' as formerly defined, to include all medicines and preparations recognized in the United States Pharmacopœia for internal and external use.

(Signed)

"F. C. HENRY,

"ALBERT E. EBERT,

"J. H. BEAL,

"Special Committee on National Legislation, American Pharmaceutical Association."

The Committee on Manufactures, after consideration and by a majority of one, agreed to favorably report the bill, still retaining the noxious drug definition. We have assurances that this definition will be vigorously fought on the floor of the Senate, and especially so, as Senator McCumber himself is interested in cutting out this addition to the definition.

This bill was placed on the calendar and that is the situation as it now stands.

In conclusion, we will state that a bill of considerable importance to pharmacy and the sale of drugs in the District of Columbia is also pending in Congress. For some years Washington has been trying to secure further legislation along these lines, and the Board of Pharmacy was requested by the Commissioners of the District of Columbia to prepare a draft of a bill for submission to Congress. The bill as prepared met the approval of the District government and was introduced in both Houses of Congress. It was the result of much work and long consideration by representative pharmacists and a committee of physicians.

This bill, though not national in character, would set a precedent for other states contemplating new pharmacy and poison laws, as this bill, with some few changes to suit local conditions, was modelled after the "Model Pharmacy Law," including with it the "Anti-Narcotic Law," both of which were endorsed by our Association.

As all of these bills are liable to come up at the coming session of Congress, your Committee would like to be further instructed.

Respectfully submitted,

FRANK C. HENRY,

ALBERT E. EBERT,

J. H. BEAL,

On motion of Mr. Hancock, the report was accepted.

The report of the Committee on Membership and Reception being next called for, Mr. Mittelbach, chairman, submitted the following:

REPORT OF THE COMMITTEE ON MEMBERSHIP AND RECEPTION.

To the President and Members of the American Pharmaceutical Association:

Gentlemen: Shortly after the meeting at Mackinac the committee was thoroughly organized and the line of work laid out. All appointees were requested to indicate their acceptance of the trust imposed upon them by this Association; and those that did so—nearly all did—were supplied with blanks and other material for the prosecution of the work. Your chairman suggested the personal appeal plan, in his judgment, would secure best and quickest results. Where appointees on this committee indicated their inability to serve, others were substituted. It was the desire of your president and the chairman of this committee to secure an active, wide-awake committee, that would thereby make known to the pharmacists of our country and Canada the advantages of membership in

the A. Ph. A. That we are successful to some extent, is indicated by the large number of applications received. And that in the future our Association will attract the attention of many good men not yet enrolled, I am well satisfied. That some were not as successful as others in securing applications, is not due to any lack of effort in pushing the work; but very likely to other circumstances and conditions. Our drug journals took a lively interest in this work; and hardly an issue but what had some good word for our Association, urging all true pharmacists to become members. To these patriotic and noble fellows—the editors of drug journals, both in Canada and the United States, your committee is especially thankful for their hearty and valuable co-operation. Not once was your committee ignored in its appeal for assistance. I believe that every thoughtful member of this Association fully realizes the necessity of special efforts by all towards effectively increasing the membership. It is a vital question, and the future prosperity of the Association depends largely upon our success in this direction. This matter is of more importance right now than anything else before us. In recent articles by a number of our members are shown in a clear and business way the benefits of membership. Such literature liberally distributed by person, not mail, will have a good effect. It is practicable. The only difficulty is to get some one in the cities who will take the time to make a personal canvass at certain intervals, to keep the matter before the profession. Several of our members did this during the past years and obtained good results. The consensus of opinion of those who have expressed themselves on the subject is, that the personal appeal plan is the best. It does seem that enough members can be interested in this work and will enter upon this plan with enthusiasm enough to carry it out. Small cities and towns can be reached in like manner. With your permission I desire especially to call your attention to the good work accomplished by our friend and good-fellow, Mr. A. M. Roehrig. He pulled off his coat and did excellent work for the Association. I believe in two or three years more he will have every pharmacist of the army and navy enrolled as a member. With the same aggressive and progressive spirit on the part of every other member of this committee, there is no telling how long the list of new members would be. To ascertain the distribution of our membership, and other data, your chairman has formulated a table showing the membership by States, Provinces, etc.; and another, showing the gain and loss of members during the past ten years, and the expenses of the Committee on Membership.

MEMBERSHIP AS SHOWN BY THE PROCEEDINGS OF 1903.

State.	Life Members.	Regular Members.	Total.
New York	21	144	165
Pennsylvania	22	125	147
Missouri	6	123	129
Illinois	13	82	95
Ohio	7	81	88
Massachusetts	12	72	84
Maryland	8	57	65
New Jersey	6	55	61
Iowa	3	45	48
Michigan	2	44	46
California	3	35	38
District of Columbia	1	35	36
Georgia	1	35	36
Indiana	—	36	36
Connecticut	1	29	30
Kentucky	2	27	29

State.	Life Members.	Regular Members.	Total.
Louisiana	1	27	28
Minnesota	1	27	28
Florida	—	25	25
Maine	1	24	25
Wisconsin	2	21	23
Texas	—	20	20
Arkansas	—	18	18
Nebraska	—	16	16
Rhode Island	—	16	16
Virginia	—	16	16
Kansas	1	14	15
Colorado	1	12	13
North Carolina	1	12	13
New Hampshire	3	7	10
Tennessee	—	10	10
Washington	—	10	10
Vermont	—	9	9
Mississippi	1	7	8
Oklahoma	—	8	8
South Dakota	—	8	8
Unknown residence	—	8	8
South Carolina	—	7	7
Alabama	1	4	5
Oregon	—	5	5
North Dakota	—	4	4
Montana	—	3	3
Delaware	—	2	2
Hawaii	1	1	2
New Mexico	—	2	2
Arizona	—	1	1
Idaho	—	1	1
Indian Territory	—	1	1
Nevada	—	1	1
Utah	—	1	1
West Virginia	—	1	1
Prov. New Brunswick	—	1	1
Prov. Nova Scotia	—	1	1
Prov. of Ontario	2	8	10
Prov. Quebec	—	8	8
Foreign Countries not including Canada	3	8	11
Total	127	1400	1527

Recapitulation.

Honorary members	10
Life members	127
Regular members	1400

Total 1537

Out of the total membership, the five largest cities of the United States and the Dominion of Canada have the following:

Greater New York 120

Philadelphia.....	89
St. Louis.....	88
Chicago	60
Baltimore	57
Dom. of Canada	20

Total..... 434 or over 28 per cent.

This table will be a guide to future committees, and indicate where special efforts should be made in increasing our membership. This table is made from the completed roster of the 1903 proceedings, by a careful count.

TABLE SHOWING THE GAIN AND LOSS OF MEMBERS AND THE EXPENSE OF THE COMMITTEE ON MEMBERSHIP DURING THE PAST TEN YEARS.

Year.	Deaths.	Resignations.	Dropped.	Total Loss.	New Members.	Net Gain.	Net Loss.	Expense.
1894	23	22	37	82	135	53	—	\$228 42
1895	14	25	83	122	136	14	—	34 25
1896	36	35	67	138	93	—	45	14 75
1897	23	63	127	213	118	—	95	6 30
1898	14	34	112	160	88	—	72	1 25
1899	24	29	85	138	57	—	81	34 50
1900	17	23	98	138	102	—	36	25 50
1901	28	44	79	151	146	—	5	7 21
1902	24	33	54	111	270	159	—	110 15
1903	16	29	49	94	220	126	—	21 13
Totals..	219	337	791	1347	1365	352	334	\$483 46

Net increase of membership in ten years, 18.

The gain and loss during the past ten years shows quite a fluctuation. In 1894-95 a small increase, and during the following six years an aggregate decrease of 334. At the Philadelphia meeting in 1902 an awakening of interest took place, which continues to date. Although a net increase of 285 during the past two years, the net increase for the past ten years is only 18. This condition ought to arouse every member to the fact that unless we keep everlastingly at it, and infuse new blood and lots of it into our Association there is danger of it going to pieces.

The total number of new members elected since March 1, 1904, the beginning of our fiscal year, is 230.

Thanking all who in any way gave assistance to this committee either by word or deed, I am,

Fraternally yours,

WM. MITTELBACH, *Chairman.*

The report was applauded, and Mr. Hancock, seconded by Mr. Hemm, moved to accept. Mr. Roehrig, supplementing the remarks of the Chairman of the Committee on Membership, told of the difficulties he had encountered, and how he had succeeded in the work until now more than half the corps of pharmacists in his branch of the Government Service (the Public Health and Marine Hospital) were members of the Association. They had been gathered in from all parts of the country and its island possessions—from New York, Washington, Ship Island, San Francisco, Honolulu and even Manila and other points, far and near. The motion to accept was then put and carried.

Mr. Ryan, Chairman, then made the following report for the Committee on Weights and Measures :

REPORT OF THE SPECIAL COMMITTEE ON WEIGHTS AND MEASURES.

To the President and Members of the American Pharmaceutical Association :

Gentlemen : Although much discussion of the subject of Weights and Measures has occurred during the past year, no very substantial progress has been made toward the adoption of the metric system in the United States. The continued opposition of mechanical engineers to the bills before Congress has had the effect of delaying action by our National Legislature. Much favorable comment is noted in English Journals, and it is entirely probable that our British friends will secure the legal adoption of the metric system of weights and measures before such action can be obtained in our own country.

It is understood that the Committee on Coinage, Weights and Measures of the House of Representatives will continue their efforts to obtain favorable action on the subject at the coming session of Congress.

Respectfully submitted,

F. G. RYAN, *Chairman.*

On motion of Mr. Wescott, the report was accepted.

The Secretary then read the following resolution coming from the Section on Education and Legislation :

Resolved, That the Section on Education and Legislation of the American Pharmaceutical Association request the endorsement of the "Mann Bill," at present pending before Congress by the general session of the Association, and that the Legislative Committee of the Association be instructed to work for its passage.

On motion of Mr. Meissner, seconded by Mr. Hancock, the resolution was adopted.

The report of Delegates to the American Medical Association was called for, and Mr. Wilbert, in the absence of the Chairman, who had failed to send in a report, offered the following as a report from the three delegates present at this meeting, adding that the eight delegates present at Atlantic City were very pleasantly received and took an active part in the deliberations :

REPORT OF DELEGATES TO THE SECTION ON MATERIA MEDICA, PHARMACY AND THERAPEUTICS OF THE AMERICAN MEDICAL ASSOCIATION.

Mr. President : Of the delegates appointed by you to attend the Fifty-fifth Annual Meeting of the American Medical Association in Atlantic City, June, 1904, Jos. P. Remington, Philadelphia; C. S. N. Hallberg, Chicago; Thos. P. Cook, New York; C. B. Lowe, Philadelphia; J. W. England, Philadelphia; W. L. Scoville, Boston; H. W. Wiley, D. C.; William C. Wescott, Martin I. Wilbert, were in attendance at the first meeting of the Section on Materia Medica, Pharmacy and Therapeutics.

As is well known, the scientific work of the American Medical Association is divided among sections. This year these sections, collectively, presented a program that contained upwards of 400 communications by men from all sections of the United States.

The Section of Materia Medica, Pharmacy and Therapeutics, which your delegates were especially appointed to attend, while numerically one of the weakest of the several

sections, presented a program that included no less than twenty-two papers and communications. Many of these papers were of vital interest, not only to the physician, but also to the pharmacist who is in any way interested in the advancement of his vocation along professional lines.

Abstracts of the several papers have been published in all of the Medical, and also in many of the Pharmaceutical Journals published in the United States, so that it will not be necessary for us to recount in detail the substance or even the titles of the several papers.

One feature of this year's meeting that must be of especial interest to the pharmacists of America was the election of a number of pharmacists to pharmaceutical membership in the American Medical Association.

Provision for this innovation had been made at the New Orleans meeting of the American Medical Association in 1903. These provisions were this year still further enlarged on, so that, in future, any reputable pharmacist, who so desires, may become a pharmaceutical member of the American Medical Association by securing the endorsement of his local or county Medical Association at least three months in advance of the date of the next meeting of the American Medical Association, and sending this endorsement, with his application, to the officers of the Section on Materia Medica, Pharmacy and Therapeutics.

Several distinctive features that especially appealed to several of your delegates, the numerically large attendance (2988?), the large and varied program, the large attendance at the several section meetings, and the close attention with which every paper presented was listened to and discussed, all evidenced the deep interest taken by the better class of physicians of America in the scientific advancement of their profession.

The simultaneous sessions of the several sections of the Association enabled them to present 400 papers in less than four days, while the printed program, including a resumé of all of the several papers presented, enabled members who might be interested in different subjects to attend and listen to such communications as they were especially interested in. The name of the Section was changed to that on Pharmacology. Next meeting in Portland, Oregon, July 14, 1905.

Respectfully submitted,

C. S. N. HALLBERG,
W. C. WESCOTT,
M. I. WILBERT.

On motion of Mr. Whelpley, the report was ordered received and referred for publication. The Secretary called attention to the change of name of the Section on Materia Medica, Pharmacy and Therapeutics, in the American Medical Association, it being now known as the Section on Pharmacology.

The Secretary stated that, following instructions to formulate the necessary changes in the By-Laws to make them conform to the action taken by the Association at the second session upon the report of the Committee on Revision of the U. S. Pharmacopœia, he had drawn the following, which would have to lie over a little while :

Amend Article I, Chapter IX, by striking out all after the word "follows" in the second line and inserting in place thereof the following: a Committee on the U. S. Pharmacopœia and a Committee on Transportation, each to consist of ten members; a Committee on Commercial Interests and a Committee on Pharmaceutical Education and Legislation, each to consist of five members; a Committee on Scientific Papers, a Committee on Practical Pharmacy and Dispensing, a Committee on Ebert Prize, and a Committee on General Prizes, each to consist of three members.

Amend Article IX, Chapter IX, by striking out the second sentence and adding at the end of the first sentence the following: "as follows: One member to be appointed for ten years and one for nine, eight, seven, six, five, four, three, two and one years respectively, each vacancy occurring by expiration of term to be filled by a new appointment for ten years. The committee shall elect its own chairman annually."

Mr. Gane presented the following proposed change of Article IV, Chapter IX, of the By-Laws, as coming from the Scientific Section:

Change Article IV, Chapter IX, to read as follows:

Any person desiring to submit a paper to the Association shall present to the Chairman of the particular section to which it refers, at least ten days prior to the meeting, an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than two hundred words.

This abstract shall be printed as a part of the programme. The paper itself must be submitted to the officers of the section previous to the first session. Not more than ten minutes shall be allowed for the presentation of any paper, unless by unanimous consent of the section.

The Secretary read the following recommendation, passed by the Section on Practical Pharmacy and Dispensing:

Moved by Mr. Hynson, that this Section recommend to the Association in general session that the Committee on the National Formulary be instructed to give the formulas in both metric and common weights and measures. Carried.

On motion of Mr. Beringer, seconded by Mr. Whelpley, the recommendation was approved.

The Secretary read another recommendation from the same section:

Mr. Eliel moved that the text of the National Formulary should not be allowed to be used in any text-book or dispensatory without the consent of the Publication Committee and without making adequate compensation to the Association therefor. Carried.

Mr. Gane, seconded by Mr. Roehrig, moved to adopt, and the motion prevailed.

The Secretary called for the report of the Committee to present the views of this Association upon the scope and character of work of the new Drug Laboratory at Washington. Mr. Kebler, of the Committee, said that Chairman Ebert, who had gone home, had put a report into his hands, but that he had not signed it, nor had the third member of the Committee, Mr. J. N. Hurty. At least two members of the Committee, he said, thought this duty should be delegated to the Committee on Drug Market, and the report so recommended. Mr. Kebler also called attention to that part of the report in regard to the placing of the laboratory at the service of the Boards of Health and Pharmacy of the country, in the solution of difficult problems, and said he hardly knew what to say or do about this and other parts of the report; that he would forward it to Mr. Ebert, who had said he would sign it, for his final action. In answer to a question by the chair, he said he would present the report as it was,

if desired. Mr. Mayo asked if Mr. Ebert was aware of the character of the report, and Mr. Kebler said he was; that he had read it over and knew all about it. Thereupon, Mr. Mayo moved to accept the report as it stood, and the motion prevailed. The following is the full text of the report as presented:

REPORT OF COMMITTEE TO PRESENT THE VIEWS OF THE AMERICAN
PHARMACEUTICAL ASSOCIATION AS TO THE MOST
DESIRABLE CHARACTER AND SCOPE OF
THE NEW DRUG LABORATORY.

Since the establishment of the Drug Laboratory a little over a year ago, various lines of work have been instituted:

1. The testing of chemical reagents with the view of ultimately setting standards for them. It is self-evident that chemists must be able to secure standards and know just what to test the reagents for before the best results are available.

2. A collaborative study of analytical methods, used in analyzing plant drugs and products derived from the same, with a view of improving the old methods and developing new ones for the purpose of unifying methods when the proper ones are arrived at. The above work should be of great benefit to future revisions of the Pharmacopoeia, and it is hoped that the work will be prosecuted as rapidly and vigorously as possible. And we would recommend that as many workers as possible of this Association take a part in it.

There appears to be some discrimination, justly and unjustly, against American cod-liver oil, and an investigation as to the correctness of this condition is desirable, and we hope the Drug Laboratory will push their work in this direction.

The laboratory should examine plants which are reported from time to time as being of great medicinal value.

The Drug Laboratory should be placed at the service of the various boards of health and pharmacy in assisting them in the solution of some difficult problems they encounter from time to time. We are informed officially that this can be done if the requests come officially from these boards.

The committee believes that the duties assigned to this committee could well be placed in the hands of the committee on the drug market. We therefore recommend that the Association delegate our duties to the Committee on the Drug Market, and discharge the committee making this report.

A. E. EBERT, *Chairman*,
L. F. KEBLER.

A report from the Committee on Status of Pharmacists in the U. S. Government Employ was called for, and Chairman Payne presented the report in abstract, the following being its full text:

REPORT OF THE COMMITTEE ON THE STATUS OF PHARMACISTS IN
THE SERVICE OF THE UNITED STATES GOVERNMENT.

During the last session of Congress a bill for fuller recognition of the improved status of pharmacists in the United States Navy was actively pushed. This bill was favorably reported by the Surgeon-General of the United States Navy, but for various reasons did not reach a final vote. The bill will probably be favorably acted upon at the next session of Congress, as the encouraging position of affairs at the last session will be very likely further improved when the bill is again presented.

The bill which was introduced in both the Senate and the House, was as follows :

58th Congress, 2d Session. Senate Bill 3,984 and House Bill 12,646.

A BILL

To reorganize and increase the efficiency of the Hospital Corps of the Navy of the United States and to define its duties and regulate its pay.

Be it enacted, By the Senate and House of Representatives of the United States of America, in Congress assembled,

That the Hospital Corps of the United States Navy shall consist of chief pharmacists, pharmacists, hospital stewards, baymen (first-class), baymen and hospital apprentices.

SEC. 2. That the number of chief pharmacists and pharmacists on the active list shall not exceed fifty in all, the pharmacists to be appointed by the President and have the status of warrant officers: Provided, that the provisions of law regulating the promotion, pay and allowances, and rights of warrant officers set forth in section twelve of the Act entitled "An Act to reorganize and increase the efficiency of the personnel of the Navy and Marine Corps of the United States," approved March third, eighteen hundred and ninety-nine, shall extend to and include all pharmacists of the Hospital Corps: And provided further, that vacancies in the grade of pharmacists shall be filled from men holding the rating of hospital steward, subject to such examination as may be prescribed by the Secretary of the Navy; and that no pharmacist shall be promoted to the rank of chief pharmacist until he shall have passed an examination as to his mental, moral, physical and professional qualifications before a Board of Officers, in accordance with regulations prescribed by the Secretary of the Navy.

SEC. 3. That the Secretary of the Navy is hereby empowered to enlist or cause to be enlisted, as many hospital stewards, baymen (first-class), baymen and hospital apprentices as in his judgment may be necessary, and to limit or fix the number, and to make such regulations as may be required for their enlistment and government. Enlisted men of the Navy and Marine Corps shall be eligible for transfer to the Hospital Corps.

SEC. 4. That all necessary hospital and ambulance service at naval hospitals, naval stations, navy-yards and marine barracks, and on vessels of the Navy and Fish Commission, shall be performed by the members of said corps, and the corps shall be permanently attached to the Medical Department of the Navy, and shall be included in the effective strength of the Navy, and be counted as a part of the enlisted force provided by law, and be subject to the laws and regulations for the government of the Navy.

SEC. 5. That the pay of hospital stewards shall be seventy dollars per month; of baymen (first-class) forty dollars per month during their first five years of service and fifty dollars per month thereafter; of baymen thirty dollars per month, and of hospital apprentices twenty dollars per month, with such increase on account of length of service as is now or may hereafter be allowed by or in pursuance of law to other enlisted men of the navy: *Provided*, That all benefits given by or in pursuance of existing laws, or that shall hereafter be allowed by or in pursuance of law to other warrant officers or enlisted men of the navy, shall hereafter be allowed in the same manner to warrant officers and enlisted men in the hospital corps of the navy.

SEC. 6. That all acts or part of acts so far as they conflict with the provisions of this act, are hereby repealed.

The letter below, properly modified to apply to the parties addressed, was sent by our committee to the members of Congress, and explains itself :

Dear Sir : There is now before Congress a bill which relates to the pharmacists in the naval service, and provides for their securing all the privileges of other warrant officers, such as are now allowed to the boatswains. A previous act on the statute book gives all of the privileges, both present and future, of warrant officers to the pharmacists. A subsequent act, however, which gives certain privileges to warrant officers, did not enumerate pharmacists, and the present amendment will give these privileges to the pharmacists to which they are really entitled, but which the Surgeon-General does not feel authorized in giving them as long as they were not enumerated in the act above referred to. Your support of this bill will be very much appreciated both by the American Pharmaceutical Association and by the pharmacists of the whole United States, as we are all deeply interested in the proper recognition of pharmacy, and this recognition now requested is one that has already been accorded pharmacists, but requires the present amendment to make it effective. Personally, I am deeply interested in a strong navy, and have been thus interested for several years, as I feel the tremendous resources of this wonderful country of ours surpass those of the whole of Europe, and with a strong navy there is a future business prosperity before this country in dealing with the whole world which will far exceed anything we have ever known. I have always felt that this trade could be best built up by a powerful navy to sustain it, and certainly after it is secured we will need a strong navy to protect it and the tremendous expanse of our far-reaching coasts. That the country is becoming more and more interested in the development of the navy is a source of much pleasure to me, and the consideration which has recently been shown to pharmacists in the navy makes the

American pharmacists more willing to go into the service and causes a less number of aliens in it, which is very gratifying. Your kind support and interest in this matter will be much appreciated.

Very respectfully,

GEORGE F. PAYNE, *Chairman.*

Any person who is a citizen of the United States, who desires to enter the Hospital Corps may, upon application to the Bureau of Medicine and Surgery, Navy Department, obtain permission to be examined for that rating which he is best qualified to fill, provided men are needed in the service at the time of his application. Applicants are either examined at the nearest receiving ship or naval station to their homes, or by the medical officers of the itinerant recruiting parties which, at this time, are covering very nearly the whole of the United States. An applicant receiving a permit would be examined as soon as he presented himself and, upon passing the examination, enlisted at once.

Pharmacists in the Navy are not enlisted from civil life, but vacancies are filled by the promotion of Hospital Stewards who have had long and faithful service.

The bill gives commissions to pharmacists such as are now given to other warrant officers. It also provides for an increase of twenty-five in the number of pharmacists in the Navy, an increase which is very much needed at present.

We have many inquiries in regard to entering the Hospital Service of the Navy, and the following statement may be of value:

If any one desires to enter either the Army, Navy or Public Health and Marine Hospital Service, the proper procedure would be to write to the Surgeon-General of the service which one desires to enter, addressing him at Washington, D. C., and ask what steps should be taken. A circular letter of information will be sent, and probably other details in regard to the location and date of the next examinations. It is well to bear in mind that the Public Health and Marine Hospital Service require graduation in pharmacy of all pharmacists.

During the past year the position of pharmacologist in the Public Health and Marine Hospital Service, with a salary of \$3000.00 annually, was to be filled, and examinations were to be held. This position was secured by a gentleman who is now taking part with us in the present meeting.

During the past year the uniform of the Public Health and Marine Hospital Service has been so modified as to cause the pharmacists to present more the appearance of professional men, much to the satisfaction of those in the service.

We have delegates with us to-day from the Navy, the Public Health and Marine Hospital Service and the Department of Agriculture. We appreciate the kindly letters of the chiefs of these divisions of the United States Public Service and their appointment of delegates.

The Committee desires to again thank the whole Association for its continued splendid support, and also the pharmacists and pharmaceutical press of the whole country, all of whom have continued to unflinchingly help the work of our Committee in a most cordial and hearty manner.

Respectfully submitted,

GEORGE F. PAYNE, *Chairman.*

On motion of Mr. McIntyre, the report was received, and referred for publication.

The Secretary said he had the report of the Committee on Transportation, and Mr. Whelpley moved to receive and refer. The motion prevailed. The report here follows:

REPORT OF THE COMMITTEE ON TRANSPORTATION.

Mr. President and Members of the American Pharmaceutical Association:

Your Committee on Transportation beg leave to report that application was made

early in June of the present year to the Western Passenger Association for reduced rates on account of the fifty-second annual meeting, and a rate of one and a third fare for the round trip, on the certificate plan, was promptly granted. This arrangement was subsequently concurred in by the Trunk Line Association, the Southwestern Excursion Bureau, the Central Passenger Association, the New England Passenger Association and the Southeastern Passenger Association. The charge of twenty-five cents by the railroads to individual holders of certificates for validation of the same, still continues in force, besides which your committee was required to deposit the sum of seventeen dollars, as a guarantee fund, to cover the expenses of the validating agent, before the reduced rate was put into effect. It has been agreed that the special agent of the Western Passenger Association shall be in attendance at the meeting on Thursday and Friday, September 8th and 9th, from 9 a. m. to 6 p. m., for the purpose of validating all certificates presented.

On account of the World's Fair at St. Louis, unusually low rates to that city are quoted this year by all railroads, and no doubt a large number of our members prefer to avail themselves of these excursion rates and then buy a round-trip ticket on the certificate plan from St. Louis to Kansas City, thereby gaining more time for a visit to the Fair both before and after the meeting. A circular of information regarding transportation was sent to all members on July 18th.

For the Committee,

CHAS. CASPARI, JR.,

Chairman.

Baltimore, August 1, 1904.

The Secretary said that a report was due from the committee having in charge the matter of bestowing memberships in the American Pharmaceutical Association on college graduates as prizes, a matter in which the President took the initiative at Mackinac last year. The President stated that the Council had referred the matter to the Committee on Membership, and his committee knew nothing about it. Mr. Ryan moved that the special committee on the subject be continued, and Mr. Hancock seconded the motion, and it prevailed.

On motion of the Secretary, an adjournment for three minutes was taken in order that, upon resumption, the Association might properly pass upon various resolutions to amend the By-Laws. Upon reconvening, the Secretary stated that there were five proposed amendments to the By-Laws to be acted upon, all of which had been read before the Association. Thereupon Mr. Whelpley, seconded by Mr. Wescott, moved to adopt all of them, and the motion prevailed. (See pages 25, 27, 58 and 59, for amendments adopted.)

Mr. Hancock then proposed the following resolutions :

WHEREAS, The American Pharmaceutical Association, from its inception, has enrolled as members the most reputable and accomplished pharmacists and druggists of America, who, by the character of their annual contributions have made it an ideal organization, and

Whereas, One of its founders, the late Prof. William Procter, Jr., became its most distinguished and honored member, through his untiring energy, ability and valued services to the close of his life, therefore,

Be it Resolved, That a committee of five be appointed by the President, said com-

mittee to be known as the Committee on the William Procter Jr. Monument Fund, whose business it shall be to solicit subscriptions for a memorial monument.

Resolved, That when a sufficient amount shall be collected by subscriptions, this Association shall authorize and have erected in the Smithsonian grounds in Washington City, D. C., a bronze monument, commemorative of the late William Procter, Jr., the Father of American Pharmacy.

Resolved, That the Committee be authorized to invite the co-operation of the various State Pharmaceutical Associations, and all other bodies and individuals in sympathy with the undertaking, and that due credit be given to each subscriber.

Resolved, That the American Pharmaceutical Association shall be the custodian of all funds collected and shall disburse the same for the object herein named, under such rules and regulations as may be adopted.

Mr. Hancock, after calling attention to the fact that this movement would involve the Association as such in no expense, then proceeded to speak on his resolutions, which were seconded by Mr. Beringer and carried.

Mr. Hynson then moved that Recommendation 5 of the report of the Committee on President's Address, which had been tabled, be taken from the table and considered in this connection, and the motion prevailed. Mr. Whelpley then moved that this matter be referred to the Treasurer and General Secretary for action, upon approval by the Association. Mr. Meissner called for the reading of the recommendation and the Secretary read the following :

5th. We recommend the adoption of the Procter certificate of membership, but do not consider it advisable that it should be made obligatory to membership. We would, however, advise that all members be solicited to procure this certificate under the plan proposed in the recommendation of the President.

Mr. Whelpley's motion was then put and carried.

The Secretary then read a telegram of greeting from Mr. W. A. Talbott, President of the Proprietary Association. Mr. Gane, seconded by Mr. Wilbert, moved that the telegram just read be received and made part of the minutes. The motion prevailed.

WARREN, PA., September 7, 1904.

President the American Pharmaceutical Association, in Session :

Regret that delegate appointed to represent the Proprietary Association at your convention now in session, just wires me he cannot attend in our behalf. Please tender the American Pharmaceutical Association the cordial greetings of the Proprietary Association and best wishes for a successful meeting.

W. A. TALBOTT, *President Proprietary Association.*

Mr. Whelpley read in condensed form the minutes of the fourth session of the Council, held at Kansas City, the full text being as follows :

FOURTH SESSION OF THE COUNCIL—SEPTEMBER 7, 1904.

Council called to order at 9 a. m., by Chairman Beal. On roll call, the following responded: Messrs. Beal, Caspari, Claus, Diehl, Eberle, Eliel, Payne, Rapelye, Roehrig, Sheppard and Whelpley.

On motion of H. M. Whelpley, seconded by S. A. D. Sheppard, the applicants for membership, Nos. 184 to 216, inclusive, were duly elected. The following report of the Special Committee on National Bureau of Medicines and Foods was read:

115 W. 68TH ST., NEW YORK, August 24, 1904.

To the Council of the A. Ph. A.:

At the last meeting of this Association, the undersigned Committee on National Bureau of Medicines and Foods was continued for one year as a committee of your body, with instructions to report at your meeting of 1904, and to report *ad interim* to the A. M. A. As our final action in pursuance of those instructions, we submit to you the following report:

The first part of the past year was occupied with a continued discussion of our subject, by means of circular correspondence, the special object being to consider and pass upon objections to the organization of the proposed Bureau. After all the members had been heard from and their views mutually considered, the following resolutions were voted upon, with the results stated after each:

1. That the United States Government is best qualified to accomplish the objects of the proposed Bureau, and that the two Associations should confine their efforts to co-operating with that Government.—Rejected unanimously. (This resolution did not receive an approving vote in the Committee of the A. M. A.)

2. That the best method of organizing the Bureau is as a private organization, unconnected with either Association.—Rejected unanimously. (This resolution received one affirmative vote in the Committee of the A. M. A.).

3. That the two Associations constitute the best means for organizing the proposed Bureau, and that we recommend to the Council that it be so organized, as nearly on the lines already proposed as practicable.—Carried unanimously. (This resolution received three votes in the Committee of the A. M. A.).

4. Condemnation of bad products may, in the discretion of the Board of Directors, be resorted to.—Carried, three votes in the affirmative, two in the negative. (Rejected by the Committee of the A. M. A., as the memory of the Chairman recalls).

5. Commendation of worthy products shall be given by means of certificates attached to each package, provided a satisfactory method can be devised.—Carried unanimously. (This resolution received three affirmative votes in the A. M. A.).

6. A resolution to include certain proprietary medicines in the working of the Bureau, was lost by one vote.

The exact wording of the resolutions is not given, for the reason that this report is written away from home, and the record is not available. Doubtless one of the members present will have a copy, and the resolutions may be added *verbatim* as an appendix to this report.

This action and these results were duly reported to the A. M. A. at its meeting held at Atlantic City, N. J., in May last. Since two of the members of our Committee had started out strongly opposed to part of these resolutions, but had finally found their objections removed, and had joined in a unanimous vote of approval, we felt justified in expressing to the A. M. A. the opinion that a majority of the members of the A. Ph. A. would meet with the same experience after a full discussion, and that they would adopt the resolutions.

Dr. Jones, the Secretary of our Joint Committee, has reported to us that the A. M. A. felt that they knew too little of the nature of the proposed plan to indorse it intelligently and that a resolution to indorse it was rejected. The Committee of the A. M. A. thereupon asked to be discharged, and the request was granted.

Upon receiving the last-mentioned report, your Committee entered upon a discussion of the advisability of the A. Ph. A. organizing the Bureau alone, and, after discussion, the following resolutions were voted upon, with the results stated below.

1. *Resolved*, That in view of the resolution of the A. M. A. to not participate in the organization of the proposed Bureau, we do not deem it expedient for the A. Ph. A. to undertake the project alone, and we recommend that this Committee be discharged. Three votes were cast, and all were in the affirmative, being a majority of the Committee.

2. *Resolved*, That in spite of the fact that the A. M. A. has resolved not to participate in the organization of the proposed Bureau, we believe it practicable for the A. Ph. A. to undertake the project alone, and we recommend the undertaking on the lines embodied in our last vote. Three votes were cast, all in the negative.

One of our members took the ground that it was not in the province of this Committee to advise as to organizing the Bureau, but merely to submit the conclusions reached, as stated in the resolutions submitted to the A. M. A. We therefore include those resolutions as a part of our report, as indicating our views of the merits of the case, but find that, in view of the existing conditions, the organization of the Bureau is better left to private interests.

Respectfully submitted,

JAMES M. GOOD,
C. S. N. HALLBERG,
HENRY P. HYNSON,
A. B. LYONS,
H. H. RUSBY, *Chairman*.

On motion by C. A. Rapelye, seconded by Charles Caspari, Jr., the report was received and the Committee discharged.

On motion by S. A. D. Sheppard, seconded by A. M. Roehrig, the Council approved of the following changes in the By-Laws:

Amend Article I, Chapter VI, by inserting in the third line, after the word "meeting," the words, "to reduce any appropriations that have been made, whenever in their judgment the current receipts are not sufficient to allow the expenditure."

Amend Article I, Chapter II, by striking out the word "of," in the second line, and inserting in place thereof the words "not to exceed."

Amend Article IV, Chapter IV, by striking out the word "of," in the second line and inserting in place thereof the words "not to exceed."

Amend Article I, Chapter V, by striking out the word "of," in the second line and inserting in place thereof the words "not to exceed."

Amend Article I, Chapter VII, by inserting after the words "Materia Medica," in the fourth line, the words, "also editors and publishers of pharmaceutical journals."

On motion by S. A. D. Sheppard, seconded by George F. Payne, the following changes in the By-Laws of the Council were adopted:

Article I, Chapter III. Strike out all after the word "of," in the second line, and insert the words "not to exceed \$300."

Strike out Article II, Chapter III.

Change the number of Article III, Chapter III, to Article II.

Change the number of Article IV, Chapter III, to Article III, and strike out everything after the word "Membership."

On motion by Leo Eliel, seconded by E. G. Eberle, the Council adjourned.

On motion of Mr. Mayo, the minutes were approved as read.

Mr. Whelpley then read the minutes of the first session of the new Council, held at Kansas City:

FIRST SESSION OF THE NEW COUNCIL—SEPTEMBER 8, 1904.

The Council was called to order by retiring Chairman Beal, at 10 a. m., who announced that the first order of business, after roll call, was the reorganization of the Council.

On roll call, the following responded: Messrs. Beal, Burke, Caspari, Claus, Diehl, Eberle, Hopp, Mason, Puckner, Rapelye, Roehrig, Sheppard, Whelpley, Candidus, Lemberger, Mittelbach and Meissner.

On ballot, the following officers were elected:

Chairman, J. H. Beal, Scio, Ohio.

Vice-Chairman, J. L. Lemberger, Lebanon, Pa.

Secretary, H. M. Whelpley, St. Louis, Mo.

On motion by F. W. Meissner, seconded by William Mittelbach, applicants for membership, Nos. 217 to 220, inclusive, were elected.

On motion by Charles Caspari, Jr., seconded by J. L. Lemberger, it was decided to present the library of the Public Health and Marine Hospital Service, at Washington, with a set of the A. Ph. A. Proceedings.

On vote, the following was adopted: "Moved by S. A. D. Sheppard, and seconded by E. G. Eberle, that the Council approve the suggestions of the General Secretary to eliminate certain parts of the proceedings and also instruct him as Chairman of the Publication Committee to still further reduce discussions and other remarks as far as possible in accordance with his judgment as editor of the proceedings."

On motion by S. A. D. Sheppard, seconded by H. M. Whelpley, the retiring members of the Council were invited to attend the remaining meetings held at the Coates House.

L. C. Hopp offered the following, which was seconded by A. M. Roehrig: "Add Section 10 to Article XIII of Chapter VIII, 'Adjournment subject to the call of the President.'" The motion was carried.

Charles Caspari, Jr., moved and S. A. D. Sheppard seconded that the By-Laws be so amended that the Chairman of the Council shall appoint the Council committees. The motion was laid over under the rules.

On motion by J. L. Lemberger, seconded by P. C. Candidus, the Council adjourned to meet at 9 a. m., Friday.

On motion of Mr. Claus, the minutes just read were adopted without change.

Mr. Whelpley read the minutes of the second session of the New Council :

SECOND SESSION OF THE NEW COUNCIL—SEPTEMBER 9, 1904.

The Council was called to order by Chairman Beal at the Coates House, at 10:30 a. m.

On roll-call, the following responded: Beal, Caspari, Claus, Diehl, Hopp, Whelpley, Candidus, Lemberger, Mittelbach, Meissner and Koch.

On motion by Charles Caspari, Jr., seconded by L. C. Hopp, the amendment to the By-Laws of the Council authorizing the Chairman to appoint the Council committees was adopted.

On motion by L. C. Hopp, seconded by J. L. Lemberger, the Committee on Publication was instructed to eliminate from the Proceedings all personal discussions.

It was moved by Charles Caspari, Jr., and seconded by J. L. Lemberger, that the Council order the publication of the revised edition of the National Formulary and that the preparation of the text and the proof-reading of the same be entrusted to the Chairman of the National Formulary Committee, for which service he is to be paid a reasonable compensation, the amount to be subsequently determined. Carried.

On motion by H. M. Whelpley, seconded by J. A. Koch, the Council approved the bill of \$30.15, covering the preliminary expenses in organizing a conference of Boards of Pharmacy.

Chairman Beal announced the following committees for the ensuing year:

Membership.—L. C. Hopp, (Chairman), J. A. Koch, F. W. Meissner, George F. Payne, E. G. Eberle, Charles R. Sherman, Harry B. Mason, Charles A. Rapelye and H. M. Whelpley (*ex officio*).

Finance.—John F. Patton, Lewis C. Hopp and Joseph L. Lemberger.

Publication.—Charles Caspari, Jr., C. Lewis Diehl, Carl S. N. Hallberg, Harry B. Mason and Eustace H. Gane.

Centennial Fund.—James H. Beal, John F. Patton and Charles Caspari, Jr.

On motion by William Mittelbach, seconded by P. C. Candidus, the Council adjourned.

On motion of Mr. Claus, the minutes were adopted as read.

Mr. Beal, seconded by Mr. Mayo, moved that the Association proceed to the election of officers of the Historical Section, and the motion prevailed. Mr. Kremers, in a few appreciative words directing attention to his initiative in establishing this work in connection with the Association, and the distinction he already enjoyed of being the historian of a veteran association of druggists, placed in nomination for first Chairman of the Section on Historical Pharmacy Mr. Albert E. Ebert, of Chicago, Mr. Lemberger seconding the motion. Mr. Cliffe placed in nomination for Secre-

tary of the Section, Mr. Martin I. Wilbert, of Philadelphia, but that gentleman felt impelled to decline on account of other duties, and himself suggested Mr. Kremers. The General Secretary expressed the hope that this motion would not prevail, as Mr. Kremers was wanted for another office in the Section. Mr. Whelpley proposed the name of Mr. Kennedy, of New York, for Secretary, but he asked to be excused, as laboring under the same disadvantage as Mr. Wilbert did. Thereupon, Mr. Gane nominated Mr. Caswell A. Mayo, of New York City, for this office, and Mr. Whelpley moved that nominations for Chairman and Secretary be closed, and that the Secretary cast the affirmative ballot of the Association, electing Mr. Ebert and Mr. Mayo to the offices indicated, respectively. The motion prevailed, the Secretary cast the ballot, and the chair declared these gentlemen duly elected. Thereupon, Secretary Caspari, after referring to the valuable work already done by Mr. Kremers in connection with the Historical Committee, placed him in nomination for Historian, and Mr. Wilbert heartily seconded the motion. The Secretary was instructed to cast the ballot of the Association, electing Mr. Kremers, which duty he performed, and the chair declared the gentleman duly elected.

The chair announced that the installation of officers was now in order, and he would appoint Mr. Kremers and Mr. Cliffe a committee to escort the newly-elected President, and such others of the officers-elect as were present, to the rostrum, that they might be duly installed. The committee escorted Mr. J. H. Beal, of Ohio, to the stand, amid the applause of the audience, and Mr. Kremers said :

Mr. President, permit me to thank you personally for giving me the pleasure of presenting a member of this Association whom, I know, we shall all greet heartily as our next President.

President Hopp said :

Mr. Beal, I congratulate you on having been elected to the highest position in Pharmacy in America. I congratulate you on behalf of the State of Ohio, which has been honored by the American Pharmaceutical Association as no other State in the Union has. Ohio has the honor of being the only State that has had two consecutive Presidents. I also congratulate the American Pharmaceutical Association on having elected as its presiding officer, James H. Beal, who, I know, will conduct the office of President to the entire satisfaction of all the members and prove to be one of the best presiding officers it has ever had. Gentlemen, I present to you your new President, Prof. Beal. (Great and continued applause).

President Hopp then fastened upon the lapel of Mr. Beal's coat the President's pin, the insignia of his office.

Mr. Beal then said :

Mr. President, Ladies and Gentlemen: I am sure you do not fully realize the embarrassment that comes to a citizen of Ohio when he is called upon to accept an office, and

of the double embarrassment in the present situation, when you have had two such—I was about to say, unfortunate—citizens following so close together. I am sure when I came to this fair city a few days ago I had no more thought of going home as President of this Association than I had of going to China as Minister of the United States. I think it is necessary that I should clear my skirts of the blame of this infliction. My friends took advantage of my innocence, and of my hailing from Ohio, and, without consulting me by word, look, wink or nod, perpetrated this mistake, and I trust you will hold them, and not me, responsible. I say this simply to emphasize the extent of my gratitude for the honor you have conferred, because, being unexpected, as well as undeserved, the honor is greater and the recipient all the more grateful. I must confess that if I had been invited to select an honor in American pharmacy, I would have selected this of all others, and my only regret is that I have learned that my election made necessary the defeat of others more deserving. It would have been better, perhaps, had the older and better workers been first honored.

Gentlemen of the American Pharmaceutical Association, I do not hesitate to say that I am proud to stand before you with this bright medal, the insignia of the office of President, upon my coat, and this emblem of my office in my hand—more proud than I would be to hold a Portfolio in the Cabinet of President Roosevelt, as highly as I admire that distinguished body and that distinguished gentleman.

At our last State Association meeting, President Hopp—who has even a greater monopoly on presidencies than I have—appointed a committee and named an hour to be devoted to the American Pharmaceutical Association, which I think was a wise thing to do, and I trust the presidents of all State Associations will do the same thing. He also selected me to set forth the value of the American Pharmaceutical Association and its work for the last fifty years, which was an unwise thing to do and should not be followed by others. In that connection I take the opportunity of referring to what I consider the peculiar character of the American Pharmaceutical Association—a character that makes it unique in this respect: That it is not an association of the wholesale and retail druggists; it is not an association of the professors of pharmacy and chemistry; it is not an association for editors of pharmaceutical journals; it is not an association for the manufacturers merely; it is an association for all of these, and, as I remarked on that occasion, it is the clearing-house in the country for all pharmaceutical interests, where all of these several professions and interests may meet on a common plane, be treated equally, justly present their pleas, be heard fairly, and decision be given equitably. It serves a purpose in its work which no other association can do, and no combination of associations can do. And while I feel my unworthiness to fill such a distinguished position, I wish again to thank you from the bottom of my heart for this very great honor, and to hope that, since the President in the future will be perhaps more of a figurehead, with the help of the able permanent officers and the Council you have given me, we shall go forward to prosperity and continued prosperity.

Gentlemen, I thank you. [Great applause.]

Mr. Beal then took the Chair.

RETIRING PRESIDENT HOPP: Mr. President and members of the American Pharmaceutical Association, I desire to thank you for the many courtesies extended to me during the past year, and my desire and wish upon retiring are that you may ever be successful, and have as interesting meetings in the future as have been held in the past. (Applause.)

President Beal then named Messrs. Hancock and Gane to escort First Vice-President-elect, P. C. Candidus, of Mobile, to the platform, and when

they had done so, he introduced him as one of the Association's oldest members and best workers—one of its pioneers—and a man whom all loved and respected. Mr. Candidus simply returned his hearty thanks for the honor that had been conferred on him.

The Chair requested the same gentlemen to escort to the platform the Second Vice-President elect, Mr. William Mittelbach, of Booneville, Mo., and Third Vice-President-elect, Julius A. Koch, of Pittsburg, but Mr. Koch had left the hall, and only Mr. Mittelbach came forward. The Chair introduced Mr. Mittelbach as one who, as Chairman of the Auxiliary Committee on Membership, had rendered almost unexampled service. Mr. Mittelbach thanked the Association for the repeated honors it had bestowed on him.

Of the three new members-elect to the Council, Mr. Hopp and Mr. Meissner had left the hall, but Mr. Joseph L. Lemberger, of Lebanon, Pa., was escorted to the platform, and the President introduced him as one of the heroic workers in the ranks of the Association, and one who had been tested in storm and sunshine. Mr. Lemberger gracefully acknowledged the honor done him, and pledged his best efforts in the work of the Council.

The Chair stated that he was sorry to announce the absence from the room of Mr. C. Lewis Diehl, of Louisville, who had again been elected to the office of Reporter on the Progress of Pharmacy, and also that of Mr. S. A. D. Sheppard, Treasurer-elect, but called on Mr. Chas. Caspari, Jr., to conduct to the platform Mr. H. M. Whelpley, of St. Louis, Secretary-elect of the Council, and asked Mr. Whelpley to perform the same office as to Mr. Caspari, General Secretary-elect. The gentlemen were applauded as they took their places on the platform. The President introduced them as old and tried in the affairs of the Association. Mr. Caspari expressed his thanks in a few words, and said that as he had just completed his tenth year of service, his re-election was a great gratification, as it seemed to indicate that his work had not been wholly unsatisfactory. Mr. Whelpley reminded the Association that his position was due to the vote of the Council, but he thanked the members for selecting as members of that body men of such mind as was evidenced by his being before them. (Applause.)

The Chair stated that this ended the regular order, and asked if there was any further business. Thereupon Mr. Caswell A. Mayo, of New York, proceeded to paint a word-picture in the richest colors of his fancy of the glorious, good time the Association had enjoyed in a social way during its week's stay in Kansas City, and offered a hearty vote of thanks to the Local Secretary and his associates on the Committee of Arrangements, to their ladies who had so nobly assisted them, and to that charming and admirable addition, the committee of young ladies, all of whom had done so much for the pleasure and happiness of the members during this meet-

ing. This motion had a hearty second in Mr. Whelpley, of St. Louis, and was carried by a unanimous and enthusiastic rising vote.

Mr. Mayo also proposed a hearty vote of thanks to Colonel W. I. Duncan, commanding officer at Fort Leavenworth, and to Lieutenant-Colonel J. van R. Hoff, senior medical officer, for their happy contribution to the entertainment of the Association upon the occasion of their visit to the Fort on Wednesday afternoon, when some two thousand troops of all arms were paraded and put through their evolutions before the members of the Association there assembled. This motion was warmly seconded by Mr. Wilbert, of Philadelphia, and carried by a unanimous rising vote.

Major F. C. Vincent, of Kansas City, handsomely acknowledged the resolutions just passed, on behalf of the druggists of Kansas City and their ladies, and Colonel Duncan and Lieutenant-Colonel Hoff, and said it would be the happiest day in their lives when they were informed that the American Pharmaceutical Association was again to visit Kansas City. (Applause).

Mr. Hancock spoke of the many civilities received at the hands of the hotel management and the press of Kansas City, and offered a vote of thanks therefor, which was carried by a unanimous rising vote.

There being no further business before the Association, on motion of Mr. Whelpley it stood adjourned to meet in Atlantic City on the first Monday in September, 1905.

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST (AND ONLY) SESSION—TUESDAY AFTERNOON, SEPTEMBER 6, 1904.

The Section was called to order at 3 : 30 p. m., in the New Casino, on Broadway, by Secretary R. C. Reilly, of St. Louis, in the absence of Chairman W. L. Dewoody, of Pine Bluff, Ark., who was detained at home by sickness, as evidenced by a letter to Mr. Whelpley, Secretary of the Council, which Mr. Reilly read. The Secretary said that only one other member of the Committee on Commercial Interests was present, viz., Mr. C. R. Sherman, of Omaha, and suggested the election of a Chairman to preside in Mr. Dewoody's place, when, on motion of Mr. W. C. Anderson, of New York, seconded by Mr. W. S. Richardson, of Mobile, Mr. Sherman was elected Chairman *pro tem*.

Mr. F. G. Ryan moved that the Section extend to Mr. Dewoody its sympathy and regret at his illness and enforced absence from this meeting, and the motion was seconded by Mr. Richardson and carried unanimously.

There being no Chairman's address at this meeting, on account of the absence of Mr. Dewoody, the Chair announced that the reading of papers was in order, and the Secretary read the following paper on telephones, by Mr. Straw, of Chicago :

PAY TELEPHONES OR DEADHEAD TELEPHONES—REVENUE OR EXPENSE—WHICH SHALL IT BE ?

Nothing is more satisfactory to the general retail drug trade throughout the country than the fact that each year is showing more and more a relief from the deadheading public. Only a few years ago demands were made on the druggists for free telephoning, free directories, free advice, almost for free medicine, and what was given free in this way by all druggists was received with little or no thanks.

In the matter of the telephone, the druggist was paying a yearly sum for an instrument and the deadheads were standing three-in-a-row all day long to use it, and were cursing the druggist because he did not provide two or three telephones for their accommodation. People were coming into the drug stores and were telephoning department stores to send them goods which the druggist had on his own shelves. Nine years ago Mr. Wm. Bodemann, of Chicago, proposed a remedy for this nuisance, which at first did not meet with the approval of the Chicago Retail Druggists' Association. The Hyde Park druggists in Mr. Bodemann's immediate neighborhood inaugurated this reform in their own district and to-day almost 1,000 druggists are thankful for this relief. The telephone company provides an automatic slot machine, every user of which has to drop a nickel for local calls before he is connected with the number called for. The druggist guarantees a certain amount per day and of all the money in the coin box over that guaranteed amount he receives a liberal share. This commission in Chicago amounts to approximately \$75,000 per year to about 1,000 druggists. These 1,000 druggists now not only do not pay \$150 per annum, amounting to \$150,000, but receive \$75,000 as their revenue, making an annual net saving of \$225,000 to the drug trade.

The telephone company provides sound-proof booths, long-distance instruments of the best kind, and sees to it that the service is such that it and the druggist may earn just as much as possible. Some druggists are earning \$75.00 a month from their telephones. Some hundreds of them are earning more than a dollar a day. The public pays five cents a call, gets good accommodation and good service, and thanks the druggist for the facilities afforded. Under such a condition it is money in our pockets to encourage the use of the telephone and to supply the service of the one company affording the greatest amount of service either locally or over toll lines. If a second company wants to put in its telephone, we know that it must receive a certain initial sum in order to pay the expense of maintaining the instrument. Thus naturally it cannot divide with us if it expects to continue in business, and if this initial sum had gone into the box of the first company we should receive at least our commission.

So we lose money if we attempt to divide our patronage in this way. On the other hand, if one company furnishing us service gives us good service, and the kind generally wanted by the public, and reaching throughout the country, our customers will be satisfied and will come again. The proposals we hear from time to time that telephones are to be furnished us practically free, and that we can keep all of the receipts, are not worth considering. People offering us service at less than half the cost are not going to continue in business nor furnish the kind of service we wish to offer our patrons. Our patrons will not pay us a regular price, or indeed any kind of a price for such service, and will get us back again into the old dead-head rut. Go into towns where druggists are still giving

away telephone service under the mistaken notion that they are pleasing their customers and holding trade, you will find that where there are two companies in operation, the curse of two dead-head telephones is about four times worse than one ever was. The only customers who are pleased are the professional dead-beats of the neighborhood, and they will be found elbowing out of the way profitable patrons who might otherwise be accommodated with telephone service and come again. Now, gentlemen, the telephones have come to stay. We see hundreds of them in our cities where there were formerly tens. The public is going to use the telephone, and when it gets service, it wants good service, and is now educated up to the fact that it is worth five cents for a local call. Let us make our arrangements in such a way that we can offer this good service to our patrons, and get a commission on the nickels which will be willingly paid for such service, and let us stick to one concern operating under one contract, so that we will get this share of all of the nickels to be divided, and not a portion of them.

The Chair invited discussion on the paper just read.

Mr. Hallberg said the author of the paper was not a member of the Association, but he would move to accept the paper, to take the usual course. He criticised the statements of the author as to the status in Chicago some years ago, when there was opposition to the movement for pay-telephones, the opposition, he said, being due to the fact that the telephone companies at that time insisted on charging ten cents for a message, and not to pay-telephones as such; if they had consented to making the charge five cents, there would have been no opposition.

Mr. Ebert differed with Mr. Hallberg. It was the ten cents charge that the pharmacists fought for, and it was the telephone company that reduced the rate. They had found out by experience they were mistaken in desiring the higher rate. He said he now got \$4.00 a week out of his telephone—half of which was clear—where he only got a dollar, and sometimes not that, under the higher rate. He regarded the five-cent rate as a success.

Mr. Hynson asked if there was a special arrangement for physicians in Chicago, or whether they had to pay too, and Mr. Ebert answered in the affirmative. In answer to a question by the same gentleman, Mr. Ebert said the pharmacists had, also, to put a nickel in the slot and pay for their own service.

Mr. Hynson said they had two exchanges in Baltimore, and he had four wires in his store, with his private 'phones at the back and public in front, thus insuring the free use of his own instruments. He said one of the exchanges allowed free use of its service to physicians.

Mr. Eccles thought the Chicago pharmacists were in a much better attitude as regards telephone service than the New York and Brooklyn druggists, and said they would like to see opposition there. He detailed some of the troubles experienced there.

Mr. Ford, of Denver, said they had an arrangement there which worked to the entire satisfaction of the druggists. Where they used to pay \$10.00 a month they now guarantee \$5.00 to the telephone company, and all over that amount received they get a 25 per cent commission on. They talk to the wholesale drug houses, the health and fire departments without charge, and doctors' calls are also free.

Mr. Burke said that in Detroit they had succeeded in getting some concession from the telephone company, and their customers could now call up anybody in the city for five cents, and the druggist got a commission on it. The customer could also call up the neighboring doctors, and the free hospitals and the police courts; the doctor could call up his office.

The next paper called for was one by J. H. Beal on the scarcity of assistant pharmacists, and he read the following:

THE DEFICIENCY IN THE SUPPLY OF ASSISTANT PHARMACISTS, AND
THE NECESSITY FOR A LONGER PROBATIONARY PERIOD.

J. H. BEAL, SCIO, OHIO.

For several years there has been an unusual, not to say a remarkable, demand for qualified assistant pharmacists. Investigation shows that this demand is not local but general, that it exists in nearly all sections of the United States, and as much in the rural districts as in the large cities, except in such favored localities as California, where the climate is an attraction, or in St. Louis, where many have been drawn by the wonders of the Louisiana Purchase Exposition.

Undoubtedly, the general business revival of late years has been partially responsible for this condition, but not altogether so. The principal reason is found in the pharmacy laws, in that they do not require of all candidates a probationary period of registration as assistant, before granting full registration as registered pharmacists with authority to become the responsible managers of drug stores.

The Ohio law, for example, requires two years' experience of applicants for the assistant's certificate, and four years from applicants for registered pharmacist's certificate. It is not necessary for the candidate to first register as an assistant unless he voluntarily chooses to do so, nor if he is registered as such is it necessary for him to remain on the rolls as assistant for any specified period of time. He can, if he have the total required experience, apply immediately for a pharmacist's certificate. Similar requirements are found in many other states of the Union.

THE EFFECT OF THE LAW.

The practical effect of this lack of a probationary period between registration as assistant and registration as pharmacist is to continually decrease the number of clerks, while increasing the number of proprietors and the number of drug stores.

Take, for example, the case of a young man who is registered as an assistant pharmacist. His certificate entitles him to perform every duty of a registered pharmacist, except to become the owner or the responsible manager of a drug store. Provided the store is under the supervision, management and control of a legally registered pharmacist, the assistant may exercise every other function of a pharmacist. He may sell drugs and poisons, compound prescriptions, and remain in charge during the temporary absence of the manager or proprietor.

The supervision by a registered pharmacist must, of course, be in good faith, and not a merely colorable supervision, such as the hanging of a pharmacist's certificate in the store, while the owner thereof gives no real attention to the business.

This assistant, having four years' experience and possessing the common impatience of the American youth to get into business for himself, takes the pharmacist's examination at the earliest possible date and becomes a full-fledged pharmacist. He can now become the owner of a store, or manage one for some relative or friend who has been attracted by the fairy tales of the enormous profits to be made out of drugs. Our newly registered pharmacist, therefore, begins to look around for an eligible corner where a new store can be established, and as soon as he can find a suitable location, leaves the ranks of the assistants and becomes a proprietor. Thus he not only takes himself out of the ranks of the clerks, but as he himself is in need of an assistant, the total decrease in the available number of clerks is two.

THE SUBDIVISION OF BUSINESS AND THE REDUCTION OF PROFITS.

But our newly-made proprietor, while he has increased the demand for assistants, has not increased the rate of compensation for assistants in the same ratio, but rather the reverse. By starting a new store he does not enlarge the total volume of business, but has merely divided an already slender patronage with his former employer, and instead of there being in that particular section one prosperous drug store able to pay one proprietor and assistant fairly well, there are now two unprofitable stores, neither of which is able to pay either proprietor or clerk a sufficient compensation.

In case the newly-made pharmacist buys an old store instead of starting a new one, while he does not divide the business, he does, nevertheless, increase the scarcity of clerks.

Thus, it is evident that the pharmacy laws as at present constituted, without the requirement of a probationary period as registered assistant, have for many years operated as an endless chain to increase the number of proprietors and to decrease the available number of assistants.

If this process had the merit of increasing the compensation of assistants while it lessened the supply, we might console ourselves with the thought that a very worthy class of men were receiving benefits, but, unfortunately,

like the traditional ill wind, it brings good to no one, since the multiplication of stores and the subdivision of business compels a meager profit for the employer and a still more slender salary for the employee.

THE REMEDIES PROPOSED.

One remedy proposed is that the States should universally adopt amendments which will permit licentiates of one State to register in any other State without examination. Such a change in the laws, while highly desirable for many other reasons, would afford only partial and temporary relief, since the scarcity is nearly as great in one State as in another.

Another and far less meritorious proposition is to repeal the pharmacy laws so far as they require the examination and registration of assistants, and to permit every pharmacist to be the sole judge of the qualifications which he shall demand of his assistants. This is an impossible proposition, and its adoption would soon be followed by the repeal of all registration laws, and the last state of pharmacy would be worse than the first.

In the writer's opinion, a far more rational proposition than either of these, and one which promises a more certain and permanent relief, is to so amend the pharmacy laws that they will not continue to operate, as they do now, to drain the clerk market and crowd the supply of stores. The amendment is very simple, viz., to require all candidates to first register as assistants and to remain on the roll as such for a period of from three to five years before they may apply for registration as pharmacist, leaving the period of experience required for assistants as it is at present, two years.

Such a change in the laws would operate beneficially in several ways :

It would in time increase the number of men available for assistants, and also gradually decrease the number of those who are seeking assistants.

It would have the effect, more important from a public standpoint, of insuring the enforcement of a proper period of experience before young men are permitted to engage in the hazardous business of supplying the public with medicines and poisons.

Probably every member of a State Board of Pharmacy will admit that he is morally certain that at nearly every examination young men are admitted to the register who are deficient in experience, but, as they present certificates from real or pretended employers which assert that the applicant has had the necessary experience, the board is helpless to prevent their registration.

The proper way, and in fact the only way, to prevent the presentation of fraudulent certificates, and to insure that every applicant shall have had a proper period of experience, is to have him on the official register for the full period of time prescribed by the law.

Probably some of those who are now anxious to speedily register as

pharmacists would object to any increase in the experience requirement, but such an objection cannot stand in the face of the great interest of the public in properly qualified dispensers of drugs and medicines, not to mention the interest of the whole pharmaceutical establishment in the benefits which would gradually follow upon such a change.

The assistants, while they might be temporarily discommoded by their longer wait, would be more than compensated therefor by the increase in salaries which employers would be able to pay by reason of improved business, and when eventually admitted to the rank of pharmacist they would be entering upon a calling not done to death by over-competition.

Mr. Ebert expressed his surprise that a man with so logical a mind as the author possessed could have so failed to grasp the whole situation. He reviewed the conditions prevailing on the continent of Europe, and contrasted the difficulty of obtaining a proprietor's license to do business there with the loose methods prevailing in this country, and declared that the pharmacy laws of America were a miserable jumble and a disgrace to the English language, most of them, and the examinations conducted by boards of pharmacy, in the limited time employed, mere farces.

Mr. Hynson also differed with the author. He thought that natural law would always prevail over statute law, and that a man who wanted to go into the drug business could always find a way; he could form a corporation, or in some other way accomplish his desire. The value of the statute law is in its educative influence, not as it touches the commercial side of the business. In his experience he had found that if assistants were well treated and well paid, and the business made attractive to them, there would be no trouble in keeping them.

Mr. Claus expressed dissent from the views of both the gentlemen who had preceded him, and thought Mr. Beal's paper was an effort to solve the problem along the line of the least resistance; that it was a going around the mountain, instead of an effort to go through it. He agreed with Mr. Hynson, however, in the proposition that good wages and time off duty would get the best men.

Mr. Mason agreed with Mr. Hynson that artificial law cannot subvert natural law, and that ambitious clerks who want to become proprietors will find a way to do so. The plan proposed by the author would not make any decided difference after the first three or four years, anyhow. The three chief causes for the scarcity of drug clerks are (1) the long hours, (2) the low rate of compensation, and (3) the professional prestige is not in consonance with the educational standard required. The large commercial houses, like the manufacturing and chemical houses, have developed with the times and opened up thousands of places for young men, where they have shorter hours and better pay, and have drawn many young men away from the retail drug trade, as has also the engineering

profession in its great development of the last few years. It is easier, however, to show existing conditions than to point out the remedy for them. Mr. Mason pointed out the fact that during the last year or two, when wages had increased from 15 to 25 per cent. in the larger cities, the supply of clerks had increased.

Mr. Ford thought Mr. Mason was mistaken as to the long hours of drug clerks. He said they did not work to exceed ten hours a day, which was no longer than the average clerk in other lines had to work. Even with these moderate hours, they could not be had in his section for less than \$20 a week, good ones, and were scarce at that. He thought the very character of our governmental system in this country, where each State is a sovereign and makes its own laws, made it impossible to carry out the ideas of Mr. Ebert, based on his observation of conditions in Europe.

After the Chairman had related some of his personal experiences in business and other incidents that had come to his personal knowledge, the paper of Mr. Beal was, on motion of Mr. Eberle, of Texas, received and referred for publication.

Mr. Hynson then read the following paper upon department accounts :

DEPARTMENT ACCOUNTS.

BY HENRY P. HYNSON.

"When my bank account balance constantly grows, in spite of the drafts upon it to meet the needs of business and expense of living, I am sure I am making money." This is quite true, and matters financial are not in a very healthy condition with you unless this can be said. Yet, such a realization, delightful if it is, gives nothing like a correct view of your business, nor does it tell you how you are making your money or just where you might lose quite a little. But suppose your balance in bank is *not* growing, and you are continually compelled to add loans to enable it to meet the demands upon it, how are you going to ascertain why this less agreeable condition prevails? That you have marked your wares to sell at twenty-five, fifty or even one hundred per cent. in advance of cost, will not, of course, explain. Nothing should be more interesting, nothing can be more helpful to a business man than a clear, accurate set of department accounts. It is only through these that he can do justice to the different departments of his business; see which is profitable, which needs reforming, which should be dropped.

Since it is a fact that students of commercial pharmacy find it difficult to properly arrange and keep department accounts and because so many of them undervalue the importance of these, it occurred to the writer that there may be "children of riper years," who do not pay as much attention to this feature of business as a good many successful men think it deserves. No matter how much capital may be invested in an enterprise, the most precious item in its management is the time and talents of the in-

dividuals employed in its affairs; even though these be paid for at so much per week or month. The time and talents which receive only contingent compensation, however, are those that demand the most careful directing. Certainly these should not be misdirected nor deceived, for, if either be so, then, it will surely follow that the capital will be misdirected and squandered; the importance of carefully and intelligently using these more precious investments cannot be overestimated, and justifies the keeping of the system of accounts suggested and which if understood, in principle, may be easily managed.

The primary accounts for such a system may be the usual ones, namely:

"Stock" or "Capital."

"Cash."

"Fixtures."

"Merchandise."

"Expense."

"Loss and Gain," and, probably,

"Personal."

"Bills Receivable," and

"Bills Payable."

Some of the possibly desirable divisions of these will be:

Cash: "Petty Cash," "Bank."

Fixtures, Special Accounts, viz: "Soda Fixtures," "Cigar Fixtures," "Laboratory Fixtures," etc.

Merchandise: "Soda Water," "Cigars and Tobacco," "Freight," "Stationery," "Paints," "Wall Paper," "Stamps," etc.

Expense: "Regular Expense," "Incidental Expense," "Salaries," "Advertising," "Printing," "Insurance," "Postage," etc.

Loss and Gain: "Discounts," "Interest," "Commissions."

Personal: Accounts with the several members of the firm, in case of partnership.

The keeping of these accounts are well understood by the experienced bookkeeper; like all accounts, the mere manner of keeping is entirely optional. A series of columns as used by some; the simple classification of items, in the so-called single entry form, as practiced by others, will answer, but the double entry method, which follows the principle that, no item can be charged against two accounts at the same time, is the only perfectly satisfactory plan of keeping these or any other accounts. The cash book should have just as many columns as there are impersonal accounts, and an extra one for personal items, the several sums of the impersonal column may be posted monthly, the entries in the personal column daily. The division and record of cash may be kept in any convenient way. There is scarcely anything a cash register cannot do in these days, but they are just like pens and pencils in this respect, as they are just like pens and pencils in another respect; they must be guided by the

hands of intelligent, careful and honest persons. The simpler kind are easier to manage. A small one for each department placed near where the particular class of goods it stands for, is sold, is the best arrangement. A cashier and checks may be used ; the checks may be of different colored paper, printed differently, or the character of sale may be indicated with pencil. Of course, the same style of checks may be used without the cashier. "How to prevent errors" and "How to catch a thief," is not, remember, the caption of this paper.

Nothing original can be claimed for the foregoing, and but little help will be offered by it to those with fair business training or experience, but in what is to follow it is hoped a few really helpful thoughts may be found. The proper placing of an item in those department accounts must occasionally offer a difficulty to the accountant, even though he be trained.

If, for instance, an invoice is received from a paper house for a set of cutters and a quantity of wrapping paper. What should be done with it? Naturally the cutters would be charged to fixture account. But the paper? Certainly to "expense" or "merchandise." It cannot be an expense until it is used, and as its use is dependent upon the amount of merchandise sold, and it adds to the cost of merchandise, it seems only fair that it be charged to merchandise. Offering a rule that articles, the use of which is dependent upon the sale of merchandise or any division of merchandise, should be charged to that account or its division, this would apply to all containers, corks, twine, etc. Stamps offer more intricacies than the most profitable articles. A prudent pharmacist, even though he may not have a sub-postal station, will sell stamps. A separate account, surely, should be kept of these, which, no matter how carefully handled, will, occasionally at least, run short. A certain sum is devoted to this stock ; it must be maintained, and the cash so used must be charged to this account. In closing books, this balance should be transferred either to "expense" or "advertising" account, unless it is preferred to take it directly to "loss and gain." If stamps are taken for regular postage, the cash required to replace these must be charged to "postage" or "expense," if a separate account is not kept ; if used for circulars, to "advertising," and if sold on credit to a customer must be charged to "merchandise."

Judgment must be used in charging perishable articles or those which are constantly being replaced. A bowl for crushed fruit, a hatchet or a dust-pan should be charged to "fixtures," or a division of same, while soda-water glasses, nails and brooms should be charged to "expense," or a division of that account.

It is supposed that every invoice received is inspected by a competent party, and the selling prices indicated when necessary for the guidance of the marker. In case it carries mixed items the department should also be indicated for the benefit of the entry clerk. It is a question whether it is better to endorse the several sums of the different departments on

back of invoice and so enter them, or charge the whole amount to one account, and, afterwards, credit it with amounts charged to the various departments. Certain it is, that great care should be exercised in recharging and crediting. It is thought that failure in this is the source of much inaccuracy; generally in favor of the smaller divisions. No doubt general merchandise suffers greatly, in many drug stores, from the drafts upon it by the soda water account. If extract of vanilla, tincture of ginger, acid phosphates, etc., are used at the fountain, they should be charged to that account and credited to merchandise; if alcohol is used in the cigar lighter, matches with which cigars are to be lighted are given away, or sponges taken to be used in cigar case, they all should be properly recharged and credited.

It must be said that the whole scheme will fail, if carefully taken inventories are not regularly at hand. The usefulness and importance of these cannot be over-estimated, especially are they necessary in case of loss by fire for the adjustment of insurances, as has been abundantly shown in connection with the Baltimore disaster. It is suggested that inventories like policies of insurance be kept apart from the building and contents to which they apply. Inventories of "Fixtures" and divisions are as necessary as are those of "Merchandise" and its divisions.

If accuracy is really desired a little thought illumined by even a spark of the justice demanded for your personal accounts will clearly lead the way to the successful keeping of these very helpful department records.

The chair invited discussion of the paper.

Mr. L. A. Seltzer, of Detroit, said his stamp account was part of his cash; if he sold two cents' worth of stamps, there was two cents in the drawer instead of the stamp. If he lost a stamp, his cash would not balance, but he was no more likely to lose a stamp, he thought, than a five-dollar bill. This system saved a great deal of bookkeeping.

Mr. C. L. Wright, of Joplin, Mo., said he had been doing business in one town for twenty-seven years and had never kept postage stamps for sale. He had perhaps sold as many stamps as any of his competitors, but he used a slot machine, in which the customer would drop a nickel, say, and get two stamps and a penny envelope. The machine sold perhaps fifty envelopes a day, and had given satisfaction to his customers and himself. He did not believe in doing too much to accommodate the public, and he thought it entirely unnecessary to buy a lot of stamps and put them in the showcase for sale.

Mr. Hynson said he would be willing to give a hundred dollars a year for such a machine that would return a penny to the customer, instead of handing out the envelope. Mr. Claus said these machines described by Mr. Wright were to be found all over St. Louis, where there were from 200 to 250 in use, and all on a paying basis.

Mr. Ebert said he had installed a slot directory with great success, and

was making a profit of \$12 or \$15 a year. The customer simply dropped in his penny and looked up the address himself, asking no aid therein. The device gave no trouble at all, and was a source of profit besides. He thought the public should be made to pay for such conveniences furnished them by the pharmacist; he followed that rule himself, and with very fair success.

Mr. Burke thought the average retail druggist did not know which department of his business was paying and which was not. In Michigan, the majority of the druggists never took an inventory, and did not keep a complete set of books; consequently, they did not know where they stood. He had asked dozens of druggists what their gross profits were on sales of a thousand dollars, and they could not tell. If they kept department accounts—separate accounts of their cigar business, soda-water trade and drug trade proper—as suggested by Mr. Hynson, they could very soon discover which department was on a paying basis and which was not, and apply the proper remedy.

Mr. F. H. Carter, of Indianapolis, had been in the drug business for thirty-five years, a large part of the time as proprietor, and was satisfied the work was doubled by the work done for nothing to accommodate the public, in comparison with the work done in former years. He had cut out in the last six months free telephones, postage stamps, city directory and a money-order system, besides one or two other things; they did not have a laundry business, nor did they take advertisements for the newspapers. He had lost one man, who said he would actually go crazy if he stayed in the retail drug business any longer, and had lost another good man for practically the same reason. This man is making \$1800 a year now, 50 per cent. more than he did in the drug business, and his disposition is altogether changed. He agreed with Mr. Mason as to the advantages over the drug business offered young men in other lines. He had made up his mind that his men should be employed only upon work from which there was some remuneration, and he believed that the pharmacists generally would have to come to that point.

Chairman Sherman thought the pharmacist should never forget that he makes his living, to a large extent, off those people who come to his store to get these accommodations.

Mr. Hancock's experience had shown there were two distinct classes of pharmacists in nearly all of the cities—those who do not accept the innovations that have come with the change of times, and who make themselves miserable and drive their customers into other stores, and those who take pleasure in accommodating their customers and who make friends and money at the same time. While he believed in the old-fashioned drug store, and its value as a training school for boys over the modern pharmacy schools, yet he thought the only thing to do now is to accept the changed conditions as they actually exist, and make the best of them.

Mr. Claus said he had a manager in each of his two stores in St. Louis, one an accommodating, enterprising man, who makes money for him, the other a man who is doing nothing.

Mr. Anderson thought the retail drug trade was like all others; if the pharmacists want to make money, they must keep up with the times. It might be well enough for the owners of old, established stands, like that of Mr. Carter, to stand by their guns and refuse to accommodate the public, but with the young pharmacist just starting out it is an entirely different thing. He was as much opposed as anybody to giving away something for nothing, but he thought the greatest mistake a druggist could make to-day was to refuse accommodations to the public that his competitors gave. The only remedy for the evil is to organize and take a firm stand against it.

Mr. Holzhauer thought such articles should be sold with a pleasant manner, with a view of getting something out of them, or they should not be handled at all. In his store, they have two hundred calls a day for stamps, but they have not sold a stamp in forty years. If he desires to accommodate the party, he says, "Leave your letters and I will have them stamped." He is content to take the cream of the business, leaving the skimmed milk to his competitors. He, also, would not sell five cents' worth of quinine, but sells a dozen pills for ten cents, and ninety-eight times out of a hundred the customer will take them and go away satisfied.

Mr. Carter took occasion to explain that his position upon this question was taken, not with the idea of being independent, but to protest against the idea being inculcated into the public mind that the drug stores of the country are simply run to accommodate the public in the matter of these small conveniences. He thought the public should be made to understand that they were selling the goods their signs imported they had for sale.

On motion of Mr. Mayo, the paper by Mr. Hynson was received and referred for publication.

Mr. Kebler then presented the following paper in abstract, with copious verbal explanation and elaboration of his text, and with blackboard illustrations of some of his points.

PRICES AND QUALITY OF CHEMICALS.

BY LYMAN F. KEBLER.

According to the fiscal regulations of the Department of Agriculture, all supplies, when practicable, must be secured by competitive bids, the award being made to the lowest bidder unless a good reason is advanced why the lowest bidder should not receive the contract. In many cases samples are submitted and tested before the award is made, but in the case of chemicals, such a procedure would be difficult to put into effect. In a few cases samples of chemicals must accompany the bids, and the samples of the successful bidder or bidders become the standards of the goods to

be supplied. It is virtually impossible to accompany each chemical listed in the proposals with the standard of purity necessary, although in some cases the presence of objectional impurities is specified, such as ammonium hydroxide c. p. must be free from pyridine and other organic bases, copper sulphate c. p. strictly iron-free, and sodium hydroxide free from sulphur and aluminum. For the guidance of all competitors of chemicals, the following introductory paragraph is inserted in each schedule sent out: "The chemicals in this list are chiefly for analytical work, and the designation 'C. P.' means 'chemically pure,' as generally understood in analytical laboratories. They must be free from all impurities which are liable to interfere in analytical work. All C. P. goods must be delivered in containers which will not be affected by the chemicals. By 'U. S. P.' is to be understood that the articles comply with the requirements of the last edition of the United States Pharmacopœia."

On looking over the price-lists of the various chemical manufacturers and jobbers of good standing there appears to be considerable agreement of prices for the same chemicals supposedly of the same quality. From this alone we are naturally led to infer that the prices quoted for the same article by the various firms, on competitive bids, would not vary greatly, but in this we are greatly in error, as a perusal of the figures of the accompanying table will show. The original figures are in the possession of the United States Department of Agriculture.

TABLE OF PRICES OF CHEMICALS.

Name and Quality of Chemical.	Quantity.	Highest and lowest bids of six competitors or more.			
		Year 1903 to 1904.		Year 1904 to 1905.	
		Lowest.	Highest.	Lowest.	Highest.
Acetic ether, rectified	lb.	60	1.75	55	75
Acetic ether, U. S. P.	"	60	1.40	60	90
Acetone, at least 95 per cent.	gal.	1.25	2.10	2.10	2.25
Acetone, C. P., must distil between 56° and 56.5° C.	lb.	47	85	40	50
Acetyl chloride, C. P.	"	1.75	4.50	1.90	4.00
Arsenious acid, compl.	"	10	15	10	20
Benzoic acid, Merck	"	70	2.60	60	2.27
Chromic acid, C. P.	"	1.10	1.90	66	1.90
Molybdic acid, pure.	"	2.00	5.00	1.95	2.94
Phosphomolybdic acid, crystallized.	"	1.40	12.00	9.50	18.00
Picric acid, C. P.	"	65	90	90	2.09
Pyrogalllic acid, resublimed.	"	1.80	3.25	1.70	2.30
Aluminum sulphate, C. P.	"	22	74	30	75
Ammonium molybdate, C. P.	"	1.75	2.50	1.60	2.25
Asbestos, extra long filaments.	"	2.05	2.50	80	2.00
Asbestos wool.	"	35	2.00	38½	45
Benzaldehyde, C. P., Merck	"	1.25	2.25	2.00	2.25

TABLE OF PRICES OF CHEMICALS.—*Concluded.*

Name and Quality of Chemical.	Quantity.	Highest and lowest bids of six competitors or more.			
		Year 1903 to 1904.		Year 1904 to 1905.	
		Lowest.	Highest.	Lowest.	Highest.
Bergamot oil.....	lb.	1.50	2.50	2.40	2.75
Blue, methylene.....	"	2.50	5.90	1.25	6.00
Cadmium chloride, C. P.....	"	1.00	1.80	1.50	2.50
Calcium carbonate, C. P.....	"	25	50	40	75
Calcium chloride, C. P., anhydrous.	"	30	60	30	70
Calcium nitrate, C. P.....	"	65	3.20	60	1.09
Calcium sulphate.....	"	3	34	2	44
Carbon tetrachloride, C. P.....	"	40	98	40	1.20
Copper oxide, C. P., black, powd...	"	62	2.00	56	1.10
Copper sulphate, granular.....	"	6½	25	8½	40
Iron by hydrogen, 80 per cent., arsenic-free.....	"	68	1.10	12	25
Litmus, blue, pure.....	"	30	2.94	50	3.25
Magnesium carbonate, C. P.....	"	45	90	45	1.00
Manganese dioxide, 85 per cent....	"	8	1.00	6	20
Methyl orange, C. P., Helianthin B.	ounce.	60	1.75	50	70
Methyl violet.....	"	6	3.25	20	35
		(5500%)			
Morphine, U. S. P.....	"	2.10	3.55	2.75	3.50
Phenacetolin.....	"	76	1.50	65	7.00
Phenolphthalein, C. P.....	lb.	4.52	8.50	4.52	6.00
Phosphorus pentachloride.....	"	1.00	4.80	1.05	1.50
Platinum chloride, C. P.....	"	8.60	12.00	8.50	12.00
Potassium bromide, C. P.....	"	35	94	48	1.19
Potassium cyanide, pure, 98 per cent.	"	30	3.60	35	50
Potassium iodide, C. P.....	"	2.20	3.75	2.85	4.00
Potassium permanganate, C. P., free from sulphur.....	"	42	60	35	1.25
Potassium sulphide, C. P.....	"	60	1.25	60	1.50
Silver sulphate, C. P.....	"	1.25	12.80	12.00	15.20
Sodium carbonate, crystallized.....	"	5	20	6	28
Sodium hydroxide, C. P., free from nitrogen and sulphur.....	"	90	2.00	95	3.52
Tannic acid, C. P.....	"	85	1.60	1.00	1.71
Uranium acetate, C. P.....	"	4.90	8.00	4.85	5.00
Zinc, granulated, No. 30, powder, free from arsenic and carbon, and containing less than 0.015 per cent. of iron.....	"	35	50	35	59

The great variations in the above prices, with a few exceptions, are difficult to explain. It is quite apparent that some of the bidders who submitted the above figures either do not know what is meant by chemicals of C. P. quality or they are endeavoring to take advantage of circumstances.

The writer is cognizant of a number of factors that contribute to these varying prices, some of which vary over one thousand per cent.

Certain competitors are willing to supply the Government with chemicals at cost or even at a loss, simply to get the contract. To have the reputation of furnishing the Government with goods is considered by many a most excellent advertisement and makes a profound impression on the public mind. It is also often used in silencing complaints by telling the complainant "we supply the same article to the Government and as yet have had no complaint."

It is well known that foreign manufacturers of chemicals frequently dispose of their surplus stock in the United States at or below cost, so as not to disturb their home market. Such chemicals sometimes form the basis of competition and frequently very little is known about their quality. Dealers frequently tell us, when informed of the shortcomings of their chemicals, "we bought it for such and such a product, and had no knowledge of its inferiority until you informed us."

In addition to the above factors, we must not forget competition. Just competition is the life of trade, and every possible effort should be made to maintain it, for it stimulates thought and brings out the best there is in man. Unfair competition, however, is a demoralizer of business, and generally brings destruction in its wake. It is unfortunate to be compelled to chronicle the fact that a few chemicals like iodine and bismuth are controlled by a few men, and the consumer must purchase from them, pay their price and accept the quality of goods they deliver, without a murmur. With very few exceptions, however, manufacturers and dealers are ready to supply the highest grade of goods if the price is forthcoming, but in a great many cases the management tells us "We must do as our competitors do." For example, if Mr. A. supplies molybdic acid at \$1.75 per pound, Mr. B. must meet, or possibly shade, Mr. A's. price or lose his customers.

A prominent chemical manufacturer recently told the writer the following incident which is far from uncommon: "Our firm made a bid on a large order for a single chemical. A few days later we received a telegram that another firm was willing to supply the chemical for a certain figure, and if we could furnish it for the same price the contract would be placed with us. Our firm could not meet the price except at a loss and we so informed the dealer. The result was we lost the order." Another chemist said, "We make some goods which are not up to the standard simply because we are compelled to meet competition and cannot do it otherwise." Such conditions are deplorable.

The ultimate object of any business enterprise is money. If the managing director is unable to make a respectable profit because he is not willing to use questionable methods, should they be necessary, it will mean the losing of a good berth and the selection of some one who can make the business pay. If some of these concerns are caught in some underhanded transaction either the responsibility is passed on and on until it

evaporates or the reprehensible transaction is ultimately traced to an ignorant clerk or laborer who is made the scapegoat. From this it can readily be seen that the standard of some firms is the least scrupulous effective manager, which usually means no standard at all, except the dollar.

When conditions of the above character obtain it is not surprising to receive a wide range of quotations when bids are submitted, and it would be remarkable if the goods bid on were anywhere near uniform in quality. To give the reader an idea as to the kind of chemicals furnished and some dealings resorted to, a few cases will be given.

The first two items in the above table, acetic ether "rectified" and acetic ether U. S. P., will serve to illustrate several questionable transactions. Both grades of acetic ether were ordered as per schedule. They were to serve as reagents for analytical work in connection with the hygienic food experiments then in progress. On arrival of the goods both were tested. The article delivered for U. S. P. quality, but not so labeled, contained about 60 per cent. of acetic ether, the remainder being water and alcohol, chiefly the latter. The product furnished as "rectified" contained about 80 per cent. of acetic ether and 20 per cent. of alcohol. On evaporating a small quantity on the water-bath a residue having the odor of a fertilizer was obtained. It was immediately realized that the designation "rectified" was valueless both as an indication of quality and the possibility of compelling the dealer to supply a high grade article; because no standard has been set for an article labeled in this manner, although it must be admitted that the jobber was not slow to label it U. S. P. The jobber was informed in regard to the nature of his deliveries and at the same time told that our contract called for and we must have an article of U. S. P. quality. The jobber in turn informed the manufacturers who immediately set about to fill our needs with the following results: The one who had supplied the rectified article made the shipment labeled U. S. P., but an examination showed that the only change made was in the label, for the article contained in the bottle marked U. S. P. was exactly the same as that furnished previously as "rectified." The other manufacturer whose product was supplied as of U. S. P. quality, sent us an article which complied with the desired standard in every respect except that it was turbid and contained an undue amount of non-volatile matter which proved to be calcium chloride. It is probable that the calcium chloride also was the cause of the turbidity, for redistillation made a pure product. The manufacturer evidently neglected to redistil the acetic ether after dehydrating with calcium chloride. If this article had been used in the bureau's analytical work months of experimental work would have been lost.

The great variation in the prices of molybdic acid, pure, and phosphomolybdic acid, crystallized, is worthy of note. The former, for the year

1903-1904, varied over 150 per cent., and the latter, over 750 per cent. These chemicals are largely used in detecting the presence or absence of alkaloids and in establishing their identity by color reactions. What disturbances the associated impurities of the cheaper articles will introduce in this work no one will venture to guess.

The quotations on calcium sulphate, potassium cyanide, 98 per cent., and manganese dioxide, 85 per cent., vary over 1,000 per cent. The excuse offered here will probably be that the quotations were on different grades of goods. Such an excuse has little weight, because the quality of the article is specified in each case. The excuse of ignorance ought never to be entertained, for every jobber and manufacturer should see to it that the quality of the goods handled by him are not an unknown quantity. Attention should also be called to the indicators given. The range of variation for phenolphthalein is nearly 100 per cent.; methyl-orange, over 190 per cent.; litmus, over 500 per cent.; and phenacetolin, nearly 1,000 per cent. The goods are nearly as variable in quality as the prices. Is it possible for chemists to obtain uniform and concordant results with such articles?

Jobbers and dealers are not slow to censure chemists and sit in judgment when their results do not agree. Have they ever thought about the quality of chemicals supplied their chemist and his inability to test them for want of time? Is it reasonable to expect reliable results with inferior chemicals? Supply your chemist with the best grade of goods money can buy, or give him time to test them, and the probabilities are that your chemist's results will agree with those of other workers.

The writer has frequently been told, while in commercial work, "If you continue to reject samples for us, we will be compelled to pay such exorbitant prices that competition will no longer be possible, and we will be compelled to go out of business." My reply invariably was, "If you intend to deal in goods of the best quality and you expect your employees to turn out high-grade preparations you must purchase such products as will comply with the proper standards."

The writer believes that several errors existed in the original bids, but the contractors failed to notify the Department to this effect. For example, note silver sulphate. The silver alone in a pound of silver sulphate at 56 cents an ounce, would cost \$6.16. It is therefore manifestly impossible for any one to furnish this chemical for \$1.25 per pound without loss to some one. Nevertheless, the contractor filled an order of silver sulphate of good quality at the above price.

Attention should also be called to the fact that a high price does not mean superior quality. It is not uncommon to meet with so-called C. P. chemicals at high prices which are markedly inferior to the ordinary commercial goods.

Conspicuous examples are sodium sulphite and sodium thiosulphate.

In justice to all manufacturers and dealers it should be said that while they are the direct agents who are the cause of these conditions, yet chemists have failed to set standards for themselves and others. The Bureau of Chemistry is at present collecting data on which to base standards which, when published, will serve as the basis of all chemicals supplied to this Department.

Drug Laboratory, Bureau of Chemistry, Washington, D. C.

The chair invited discussion upon this most excellent paper.

Mr. Kirchgessner said he desired to call attention to the fact that sweet spirit of niter, quoted as low as thirty-five cents a pound, was found on examination to be made with fifty per cent. alcohol, instead of pure alcohol. With spirit of camphor it was the same way. He could not understand why the formula of spirit of camphor was changed so as to permit the use of twenty or thirty per cent. of water, instead of pure alcohol. The grocers are underselling the druggists everywhere, and are using wood alcohol.

Mr. Eccles stated that, when in the Government service, he had had difficulty with the manufacturers, who would put a low price on drugs and then supply an inferior article. He would return it, but would finally have to take something far below the standard. The manufacturers made war on him after a time, and did all they could to get him out of office, and he feared Mr. Kebler would have the same experience.

At this point, Mr. Hynson moved to defer further discussion until the election of new Section officers and members. Mr. Kirchgessner moved to receive Mr. Kebler's paper and refer for publication, which motion was seconded by Mr. Hallberg and carried.

The chair called for the nomination of members of the Committee on Commercial Interests for the ensuing year, beginning with Chairman. Mr. Anderson proposed the name of Mr. Chas. R. Sherman, of Omaha, for Chairman, as a recognition of the very efficient manner in which he had conducted the work of the Section in the absence of Chairman Dewoody, and Mr. Hynson seconded the nomination. Mr. Kirchgessner moved that Mr. Anderson cast the vote of the Section electing Mr. Sherman, and the motion prevailed. Mr. Anderson cast the ballot as directed, and declared Mr. Sherman duly elected. Mr. Sherman thanked the members, and said of course he would accept. Mr. Kirchgessner then moved that Mr. R. C. Reilly, of St. Louis, be elected to succeed himself as Secretary, which motion was seconded and carried, and the gentleman was declared duly elected. Mr. Reilly briefly expressed his thanks. Mr. Meissner nominated Mr. Mathias Noll, of Atchison, Kan., for one of the associate members of the Committee, and Mr. Richardson seconded the motion. Mr. Eliel nominated Mr. F. H. Henry, of Indianapolis, for associate member, with Mr. Anderson as a second. Mr. Claus nominated Mr. O. W.

Bethea, of Mississippi, for associate, and Mr. Anderson seconded. Nominations were closed and the chair put the vote on the election of these gentlemen as associates on the Committee, and the motion carried without dissent.

Mr. Hynson then moved that discussion of the paper of Mr. Kebler be resumed.

Mr. Kirchgessner thought Mr. Eccles ought to be glad the manufacturers had gotten him out of his position, and he deserved a vote of thanks for doing what he did.

Mr. Hallberg said he was out of the room during the discussion on slot machines, and on his return he was glad to see the Section wrestling with a *real* commercial question—a preëminently commercial subject, based on scientific principles. It was work of this kind that would show the druggists throughout the country the importance of utilizing the knowledge they possessed in actually earning money in a thoroughly legitimate way. He lamented the fact that the State Associations took so little interest in scientific work, and recited the conditions in Illinois especially. He congratulated Mr. Kebler upon his admirable paper and the work he was doing.

Mr. Wilbert thought Mr. Kebler had given a valuable outline of the proper work for this Section. Here is work the pharmacist can do—work which he can bring to the attention of the physician and the public—and if done properly he will elevate himself in his own estimation and in the estimation of the public and other professions.

Mr. Eliel said he was gratified to listen to such a paper, and endorsed the remarks of Mr. Hallberg. It was particularly work of this kind that the American Pharmaceutical Association should take up. He complained of the great difficulty he had had in getting absolutely pure acids of U. S. P. standard. After numerous attempts with different houses, he had finally succeeded in getting absolutely pure acids from Baker & Adamson, of Easton, Pa.

Mr. Kebler said the manufacturers had as yet found no fault with him for calling their attention to deficiencies in their articles furnished, and seemed to recognize that it would be unfair to accept such a product at a lower price and discriminate against the man who sells good goods. He said the price was often no indication of the quality of the goods; some products marked C. P. were not as good as others making no such pretensions and selling at half or fourth the price. Bidders for government supplies sometimes made grave errors in their bids and did not seem to realize it, as they did not ask to have them rectified.

Mr. Hallberg asked Mr. Kebler if they had any data on the particular brands of chemicals. He said his observation had been that in the central and western part of the country the wholesale druggists sold most of their chemicals in packages under their own labels, without the slightest

test of the Pharmacopœia having been applied, and that as these goods were mostly made in Germany, and were of inferior quality and imported through brokers in New York, he would like to have some information along these lines.

Mr. Kebler said they had considerable data of that character, but it was not set out in his paper, nor did they care to make it public: but if anyone interested would come to the Drug Laboratory in Washington, he would be glad to talk to him on the subject. He said he knew there were manufacturers in the country that did just that thing. He went on to say that the majority of manufacturers were willing to make goods of superior quality if they could get the price for them, and he did not blame the manufacturers so much for existing conditions as he did others. He thought pharmacists should be particular in specifying brands, especially in assay work, and said goods could be gotten if they went at it in the right way. He particularly commended the house Mr. Eliel had named.

Upon motion of Mr. Seltzer, the Section then adjourned *sine die*.

MINUTES

OF THE

SECTION ON EDUCATION AND LEGISLATION.

FIRST SESSION—WEDNESDAY MORNING, SEPTEMBER 7, 1904.

Chairman H. B. Mason called the Section to order at 9:45 a. m., in the Club-Room of the Coates House. Mr. J. O. Schlotterbeck was asked to take the chair while the Chairman read his address, which he presented as follows:

CHAIRMAN'S ADDRESS.

It is customary in a chairman's address to make recommendations. I shall make none. Ordinarily the recommendations are approved and admirable resolutions are entered upon the minutes and promptly forgotten. I shall attempt no reform by resolution. My purpose in this address shall simply be to review the chief events of the year that has elapsed since we met on the historic and enchanting shores of Mackinac Island, permitting myself to be guided by the assumption that it is well for us to pause occasionally, glance backward over our course, and get a commanding view of the route we have travelled. Points of progress which have been passed are thus made to stand out more clearly, a sense of perspective is gained, and things are seen in their proper relationship and grasped in their significance.

For two or three reasons the year has been an eventful one in pharmacy. It has done nothing less, indeed, than to usher in a new era in the evolutionary development of the profession. Over thirty years ago a movement was initiated which, consciously or unconsciously to its supporters, looked towards the enactment of a pharmacy law in every State and Territory in the Union—a law making it necessary for druggists to undergo State Board examinations, and surrounding the vocation with other necessary and proper restrictions. This movement has been brought to its culmination during the past year by the action of Congress in enacting a law for Indian Territory, the last Commonwealth to be provided with a statute. The first stage in the legislative process has thus been passed; but we have more reason to congratulate ourselves over the fact that the second stage has been entered upon without delay. New York has this year placed an act upon her statute book which insists that every man who desires to practice the art of the apothecary must not only pass the State Board examination, but must also be graduated from a reputable school or college of pharmacy. The year has thus witnessed the closing of one era and the opening of another; and it is no idle statement that the date 1904 will be looked back upon with great interest in the years to come, when the historic

sense and the pride of profession shall have reached a fuller and more satisfactory development in pharmacy.

Education is the basis of the social structure. It is the foundation stone in the progress of any race, any nation, any calling, any individual. To build the house upon anything else is to build it upon the sand. That pharmacy has entered definitely upon an era of higher education is therefore cause for great rejoicing, and full of significance for the future development of the calling. But we may not expect the movement to proceed with haste. It has taken thirty years to complete the first step in the legislative process, and the next step, because more radical, will consume more time. Medicine initiated the demand for compulsory graduation forty years ago, and sixteen of the forty-five States and Territories of the United States proper are still unprovided with statutes insisting upon the possession of a medical degree. Indeed, it is far better to build slowly but surely. A calling cannot be suddenly and artificially elevated by legislative enactment any more than a boy can lift himself by his boot straps. That legislation is ineffective, and may even be harmful, which does not hold itself backward to keep pace with the evolution of public sentiment, and which does not secure its strength from an enlightened public support. For the present let us be grateful that the Minnesota and the Pennsylvania pharmacists have pledged themselves to follow the initiative of New York at the earliest practicable moment.

But there is one thing we must anticipate and guard against in the very beginning of this movement. The history of medical education in America warrants the expectation that as soon as the different States demand graduation of every pharmacist a horde of mendacious and avaricious schools, realizing that a golden opportunity is presented to them, will arise and appeal to the illiterate and the slipshod with low entrance requirements and a curriculum entirely inadequate. It will be of no use to demand graduation if we are only to obtain graduates who have attempted the impossible task of grafting a smattering of pharmaceutical knowledge upon a dead limb. The tree will never flourish in this manner. The New York law provides for a preliminary standard representing 12 regents' counts; this is a good beginning, but it should be generally and thoroughly understood to be a beginning only, and honest efforts should be made from time to time to build upon the foundation thus laid. Furthermore, in order that the other contingency may be met promptly and effectively, the New York law should be amended as soon as possible, and made to establish a more definite curriculum standard than that imposed by the mere provision declaring a two-years' course to be the minimum. Two years of how many weeks each? it might well be asked. And weeks of how many hours of instruction?

It is imperative that every prerequisite law should insist upon the observance of rigidly defined preliminary and curriculum requirements if the movement for compulsory graduation is not to be sapped completely of its power for good. A high-school course, despite the fact that it is already enacted by a few university schools, may perhaps not be feasible as an entrance requirement at the start; it may have to be approached gradually and cautiously lest it become alarmed and fly out of reach; but it is after all little enough to demand, and it should be invariably required certainly within the next decade. And as an additional safeguard, the board of pharmacy should be given or should assume power to discriminate against colleges with low entrance requirements, and with courses of study which would effectually defeat the law while pretending to observe it. That the boards of pharmacy of the country are at this very meeting of the American Pharmaceutical Association to form a conference augurs well for united action along this and other lines of co-operative effort; and it is a source of gratification, too, that we have a Conference of Pharmaceutical Faculties which is bound to exercise a strong influence for higher standards during the coming years. The reforms which come naturally from within, and which are not forced more or less artificially from without, are by

far the most salutary and the most likely to be permanent; and in the present instance we may look to the Conference of Faculties for benefit even more than to legislation, remembering that the Association of American Medical Colleges has proved in the sister profession of medicine the most potent force in the establishment and maintenance of suitable entrance and curriculum standards.

This discussion of educational standards and requirements leads to the consideration of two other significant events of the past year—events of scarcely less importance than the enactment of the prerequisite law in New York. I refer to the university connections made by two of the leading colleges of pharmacy: the amalgamation of the New York College with Columbia University, and that of the Maryland College with the University of Maryland. At the outset the connection will probably bring no marked change in either case. A large measure of local autonomy is left to both colleges; it is understood that certainly for the present they will be financially independent; and in one instance, at least, the degree of Ph.G. remains outside the scope of the affiliation. But it cannot be doubted that the association between college and university will grow more and more intimate, and that it will be pregnant with benefit to the cause of pharmaceutical education.

Our independent colleges of pharmacy have done heroic work. They began it in sacrifice and unselfishness. They have continued it often amid discouragement and despair. They have builded better than they knew, and it is no reproach now to intimate that the time is rapidly coming when they may well turn their task over to the universities. The day of co-operation and combination of effort has come in education as it has come in industry; and the statement need arouse no resentment that a pharmacy school enjoys far better advantages as part of a university system than it can possibly secure as an independent institution.

The future of the independent college is indeed problematic. The curriculum has developed with the years; the faculty has enlarged; other expenses have increased; and in all but a few of the very large colleges—perhaps not even in them—the financial struggle to make both ends meet is fatal to that equipment of men and facilities which is imperatively demanded. Economy of administration would be secured from university affiliation. The advantages of either endowments or State support would in almost every instance flow from it. An equipment and an atmosphere would be gained which are otherwise impossible. Higher ideals and more elevated standards would inevitably result. For these reasons it is gratifying that two representative colleges of pharmacy, one of them the second largest in the country, have established university connections during the year. Their action will doubtless serve as a beacon light, and we may now expect similar affiliations on the part of other leading colleges within the next few years. Meanwhile it is of interest to note that schools of pharmacy are now maintained at the State Universities of California, Illinois, Iowa, Kansas, Maine, Michigan, Minnesota, Ohio, Wisconsin and Maryland, and by Northwestern, Union, Purdue and Vanderbilt. In a few instances the connection is remote and nominal, but in the majority of cases it is vital and reciprocal.

The first prerequisite law passed, and two others about to be brought forward; a Conference of Pharmaceutical Faculties now well established; a similar conference of boards of pharmacy on the eve of organization; the well-marked beginning of a movement towards university affiliation on the part of our colleges—do not all these things augur well for the future of educational pharmacy, and, therefore, for the welfare of the profession itself? For we may depend upon it that as soon as a better educated class of men enter the calling, its dignity and usefulness will be vastly increased, and its measure of public support enhanced. These results will form attractions of themselves, and will draw to the profession a class of young men who pass coldly by and enter the doors of occupations where a greater premium is put upon education.

I pass on now to mention a phenomenon of the last year or two which is suggested

by the remarks of the previous paragraph—the stringency of the drug-clerk market. Pharmacists in many of our large cities know how difficult it has been to get, not only good clerks, but any clerks at all. We may well grow alarmed at this when we consider that a lower grade of apprentices means a lower grade of pharmacists, and a sinking and deteriorated vocation. Why has there been this scarcity of clerks? For two reasons: In the first place, young men do not contemplate with satisfaction the long hours and the moderate pay which the drug business involves, and in the second place, if they are young men of good education and high ambition, they do not find in pharmacy that professional dignity and that social standing which appeal to them in medicine, law, and such of the newer professions as engineering and the like. Elevate the character of the calling, and men of the right sort—men who will not only maintain, but who will advance the standards of the vocation—will not be frightened away from our doors. And the financial horn of the dilemma will be partially avoided in the same manner. For the education of to-day, unlike that of yesterday, makes for business success; and the establishment of thorough and scientific courses of commercial instruction in all our leading universities is significant of the modern conception that a business career requires training no less than a professional one, and that the best educated man is also the best business man.

But of course the stringency of the drug-clerk market, especially in the immediate future, will not be entirely overcome by an advancement of educational standards. Clerks must be paid higher salaries and given fewer hours of work if they are to be won over. To do this is not in many instances going to be so easy as it sounds, but the effort must nevertheless be made; and indeed an increase of wage has already come inevitably in several of our larger cities, resulting naturally in an augmented supply of men. The combination and the early-closing movements offer some hope of correction; the drug-clerk associations are in a few instances making amicable arrangements with the associations of proprietors, particularly as to “shorter” hours; but it remains for the individual pharmacist who wants to secure and keep good clerks to offer greater inducements than he has been willing to extend in the past.

While on the one hand it is clear from the events of the last year that we are entering an era of more stringent educational requirements, there are not wanting evidences on the other hand that these requirements are becoming more and more necessary if the pharmacist is to discharge the obligations which rest upon him. Within the last few years there has been a growing demand for greater purity and excellence in medicaments. State pure food and drug laws have increased in number; every year sees them more vigorously enforced; a national act all but passed at the last session of Congress, and will doubtless become law at the next; the American Chemical Society has recently been considering ways and means of improving the character of commercial chemicals, and has appointed a strong committee for the purpose of starting a reform; medicine and science are developing rapidly and are demanding more exact methods; the state is constantly holding every guardian of the public health to a more rigid accountability; and within the last year or two pure-drug crusades have swept down upon the pharmacists of Boston, St. Louis, Washington, D. C., Newark, New Orleans, and New York, with a vigor which has brought alarm and consternation. The hand-writing is on the wall. The portent is clear. The pharmacist of the future will more and more be held by the courts, by physicians, and by an enlightened public to a stricter responsibility; and he must be able to meet the obligation or suffer the consequences.

Passing on now to consider other evidences of progress registered during the year, the American Pharmaceutical Association may well congratulate itself that the anti-cocaine movement which it has fostered so wisely has yielded three additional laws—those of Maryland, New Jersey, and Virginia. The Maryland statute is practically a duplication of the Beal specimen measure approved provisionally at the Mackinac Island meeting last

year. The Beal draft formed also a part of a general poison law before Congress, but did not become law. A fifth bill before the New York legislature likewise failed of enactment, and possibly not without detriment to the movement. For this measure was radically different from the Beal specimen; and nothing seems to me more clear than this, that Congress and the different states ought to enact legislation as nearly uniform as possible, following an accepted standard when it is available. The necessity for uniform legislation has been realized in this country during the last few years, and systematic efforts have been made to bring order out of chaos with such statutes particularly as have to do with negotiable paper, divorces, and the like. In effect, the United States is one great commonwealth; it is no longer what it once was, an aggregation of independent and unrelated units; and legislation must be uniform if it is to cope with the conditions successfully. It is to be hoped that the New York pharmacists, grasping this truth, will endeavor at the next legislative session to secure the enactment of the Beal draft, and that other states will take the same action.

A brief reference may now be made to certain other noteworthy events of the year. It is a gratifying evidence of progress that much sentiment has developed against trading stamps, and that laws hampering their use have been enacted in the city of St. Paul, and the States of New York, Maryland and Minnesota—although the New York measure has recently been declared unconstitutional by the courts. A novel ordinance has been passed in Chicago confining the sale of carbolic acid to physicians' prescriptions unless it be in solutions of less than five per cent. strength, or except the acid, though present in large percentages, be mixed with equal amounts of alcohol and glycerin. Final decision in the famous Park case strengthened the tripartite and direct-contract plans of distributing proprietaries by the assertion that the manufacturer of a patented, trademarked or copyrighted article has the right to declare and maintain the conditions under which his goods shall be sold. The Macy decision, declaring that uncopyrighted books, because they *were* uncopyrighted, passed out of the control of the manufacturer when they left his hands, virtually confirmed the Park decision, and consequently gave added strength to the N. A. R. D. cause.

Finally, it is exceedingly gratifying that the last year has witnessed a desire on the part of pharmacists to honor those among them who have served the calling long and faithfully. The erection of a monument over the grave of Dr. Charles Rice; the unveiling of a bronze tablet in the hall of the New York College of Pharmacy to the memory of the same distinguished servitor of pharmacy; the bestowal of a medallion upon Professor Wall, of St. Louis, and another upon the college which he has served for 30 years; the presentation of an oil portrait of Professor Wulling to the University of Minnesota, recalling a similar deed performed two or three years ago by the pharmaceutical alumni of the University of Michigan as a deserved tribute to the beloved and admired Dr. Prescott—do these acts not prove a generous and loyal spirit in pharmacy? Are they not intensely gratifying to our pride and honor?

The address was heartily applauded.

THE CHAIR: I am sure that the Chairman of this Section deserves the thanks of every member of the Association for the very scholarly manner in which he has presented topics of legislation and education in his paper, and I am equally sure that the members of the Section will be ready to extend their thanks. To me it has been a great pleasure to be here this morning and hear it. He has covered all the points and presented them in a fearless manner.

Mr. Schlotterbeck went on to say that it was hardly necessary to appoint

a committee to consider the address, but that he thought time might be profitably given to a discussion of some of the topics treated of.

Mr. Hynson warmly commended the note of encouragement to the pharmacists of the country in the Chairman's Address. He spoke of the recent affiliation of the Maryland College of Pharmacy with the University of Maryland, and the fact that it was received with open arms by the University, and especially by the medical department thereof. He contrasted the conditions in 1841, when the Maryland College of Pharmacy was organized—a time when medicine did not recognize pharmacy and stood out independent and apart from it—with the present situation, when four members of the pharmaceutical faculty are on the Board of Regents of the Maryland University. Here was advancement that could not be gainsaid. He thought the present movement in this direction would beget respect for the profession and bring in a better class of students.

Mr. Kremers said he thought there were but few who really appreciated the significance of the affiliation of the New York College of Pharmacy with Columbia University within the last year, in the higher educational standard that would result. He thought the movement exceedingly opportune, and that its influence would be felt throughout the country.

Mr. Schlotterbeck thought the present movement would do more for the cause of pharmacy than anything that has been done in the last two decades.

Mr. Mason resumed the chair and called for the Secretary's report, which Mr. Cliffe read as follows :

REPORT ON LEGISLATION.

In accordance with the by-laws of the Association we have prepared a synopsis of the laws that have been presented and enacted in the various states and territories during the past year.

On account of the fact that a large number of the states hold biennial sessions, the number of measures put into the legislative hopper is smaller than it was last year and than it will probably be next year, but the activity of those who hold to the opinion that there is a legislative panacea for all the ills and evils that infest society in its broadest sense is apparent, and illustrates the point that an active legislative committee is a necessity in every State Association.

DELAWARE.

Passed: The municipal council of the City of Wilmington passed a stringent anti-narcotic ordinance that is effectively enforced within the city limits. It penalizes the setting up, or causing to be set up and established in "any house, room, outhouse, tent, booth, arbor or other place whatever," apparatus for the smoking of opium, or permitting same to be done on such premises, for which the owner is responsible.

The sale or gift of opium, morphine, cocaine, or any of their salts, except to registered druggists, or to persons named in written prescription of a legally qualified physician; which cannot be renewed, is prohibited.

DISTRICT OF COLUMBIA.

Pending: There is at present a bill before Congress which is a complete reconstruc-

tion of the pharmacy law of the District. This proposed law contains a number of provisions that are novel to existing laws, in that all engaging in the sale of poisons, whether for use in the arts or as insecticides, if not licensed as pharmacists, must obtain a special license to conduct such sales, and this license is to be renewed every three years.

There is further provision: That each applicant for renewal of license to practice pharmacy must have been actively engaged in the practice of pharmacy within the five years immediately preceding the date of such application, and that no person shall make any false or fraudulent representation for the purpose of procuring a license, or renewal thereof, either for himself or for another, and in case such means are employed, the license, permit or renewal is declared null and void.

Section 6 provides "that the license of any person to practice pharmacy in the District may be revoked if such person be found to have obtained such license by fraud, or to be addicted to the use of any narcotic, stimulant or other substance or to be suffering from physical or mental disease in such manner and to such an extent as to render it expedient that in the interests of the public his license be canceled, or to be of an immoral character, or if such person be convicted in any court of competent jurisdiction of any offense involving moral turpitude. It shall be the duty of the Major or Superintendent of Police of said district to investigate any case in which it is discovered by him, or made to appear to his satisfaction that any license issued under the provisions of this act is revocable and to report the result of such investigation to the commissioners of said district. And, unless said commissioners are satisfied that upon the showing made by said report such license is not revocable, said commissioners shall cause a petition to be presented to the Supreme Court of the District of Columbia, sitting as an equity court, praying that such license be revoked. And said court is hereby authorized to hear and determine any case so presented and to issue such orders and decrees revoking or suspending such license as to said court may seem proper."

Section 5 provides for the granting of certificates without examination or upon a "limited" examination to holders of certificates from other States, Territories and foreign Countries when such States, Territories and foreign Countries have a standard of competence not lower than that of the District of Columbia, and accord similar recognition to licentiates of the District, the facts being determinable by the Board.

FLORIDA.

Passed: A bill that is reported to be an anti-narcotic measure based upon the Beal model, was passed at the last session of the Legislature and is now in force.

ILLINOIS.

Passed: City of Chicago: A municipal ordinance prohibiting the sale of carbolic acid or any extract or product thereof or any preparation or compound of which it is an ingredient containing more than five per cent. of carbolic acid, except upon the duly written prescription of a duly licensed physician. The act specifically exempts from its restrictions a mixture of equal parts of glycerin, alcohol and carbolic acid, also crude carbolic acid in quantities exceeding one gallon at a single sale.

INDIAN TERRITORY.

Passed: A pharmacy law for Indian Territory was passed by Congress at the last session, thus completely covering all of the States and Territories with the exception of one small county in Maryland (Talbot), which was specifically exempted from the provisions of the Maryland State law.

There seems to be nothing that is different to many of the existing statutes until section 12 is reached which, after providing for the usual prohibitions, makes exceptions specifically as follows:

"Provided, that nothing in this act shall interfere with the business of those merchants

who keep on sale such poisons, acids and chemicals as are regularly used in agriculture, mining and the arts, when kept and sold for such purposes only in sealed and plainly labeled packages. Provided, also, that nothing in this act shall in any manner interfere with the business of any physician in regular practice, nor prevent him from supplying to his patients such articles as may to him seem proper; nor with the marketing and vending of proprietary and patent medicines in towns of one thousand inhabitants or less; nor with the exclusive wholesale business of any dealers, except as hereinafter provided, also, that nothing in this act shall in any manner interfere with the business of merchants in towns having less than one thousand inhabitants in which there is no licensed pharmacy or with country merchants to sell or vend such medicines, compounds and chemicals as are required by the general public and in form and manner prescribed by the Board of Pharmacy."

Section 13 provides, "That no one who habitually uses intoxicating liquor as a beverage shall be appointed on the Board of Pharmacy nor be licensed as a pharmacist or assistant pharmacist. The Examining Board shall in all cases require each applicant to file his written declaration, duly sworn to, that he does not habitually use vinous, malt or alcoholic liquors, morphine, or other like preparations, as a beverage or otherwise. Any one swearing falsely in the affidavit so filed shall be guilty of perjury, the same to apply to persons getting permits, as provided for in section 12."

Section 15 provides for a license fee of \$100 for a term of one year or less for any "itinerant vendor of any drug, nostrum, ointment or appliance of any kind, intended for the treatment of disease or injury, who shall by writing, printing or any other method, publicly profess to cure or treat any diseases or injury, or deformity, by any drug, nostrum or manipulation or other expedient."

Section 16 provides for the exemption of pharmacists from jury duty.

This enactment seems to be the first attempt to control the sale of "patent" or proprietary remedies that has met with sanction by any legislative body in this country, and its application will, no doubt, be watched with interest by all pharmacists.

IOWA.

Not Passed: A bill was introduced which required each candidate for an R. P. certificate to be twenty-three years of age, and to have had not less than four years' experience—no portion of this time allotted for experience was to be spent in attending school or doing other work—and evidence of a three years' high school course or its equivalent. There was further provision that any applicant twenty-one years of age holding a diploma from the State University, Department of Pharmacy, or any other college having equal requirements for its degree, could be granted a certificate as assistant pharmacist, good for two (2) years, without examination; this certificate, at the end of two years, to be replaced by that of an R. P., provided there was two years of practical experience previous to graduation from college.

Not Passed: A bill was introduced to compel all manufacturers and dealers in proprietary remedies containing more than ten per cent. of alcohol to label with formula.

Not Passed: A bill was introduced prohibiting the appointment of pharmacy commissioners who were not total abstainers and graduates of the State University, or other institutions having similar requirements for degrees.

Passed: An appropriation was made to reimburse pharmacists who had been members of the State Board for expenses incurred in enforcing the pharmacy law, which was directed to be paid the ex commissioners or their estates as per filed accounts.

KENTUCKY.

Not Passed: A bill was introduced providing for the appointment of a State Pharmaceutical Inspector, whose duty was to have been the inspection of stores and the gathering of products for examination. It was strongly opposed by pharmacists as an unnecessary superseding of the Board of Pharmacy.



Not Passed: A bill was introduced requiring the Board of Pharmacy to grant certificates to persons holding them issued from other States.

MARYLAND.

Not Passed: Bills providing for amendments to the various sections of the existing pharmacy law as follows:

Section 6. Providing that the salaries of the members of the State Board be made \$50 per year, with an additional \$200 to the secretary.

Section 13. Providing that certificates shall be conspicuously displayed in stores, with penalty for non-compliance.

Section 13a. Making it a penal offense to display a certificate in store when the person in whose name it was issued is not regularly employed there.

Section 16. Providing for and legalizing the sale by country merchants of non-poisonous medicines and proprietary remedies, and poisonous substances for use in the arts and as insecticides.

Sections 18 and 19. Applying the pharmacy law to Talbot county, which was exempted in the original act.

Not Passed: A bill that was introduced to regulate the issuance and redemption of trading stamps.

Passed: A bill having the essential features of the Beal model anti-narcotic law was introduced, but after considerable opposition it was modified in its restrictions, so that it finally passed.

MASSACHUSETTS.

Not Passed: A bill was introduced compelling the proper labelling of liquors, giving proper name and kind of liquor sold, as well as name and address of vendor.

NEW YORK.

Not Passed: A bill was introduced making it a misdemeanor to manufacture soda water, ginger ale, etc., in any building occupied wholly or in part by persons or families for living purposes.

Not Passed: Bill to prohibit the use of cocaine in proprietary medicines, wines and liquors.

Not Passed: A bill providing that no tobacco, cigars or soda water be sold on Sunday in any store where liquors are sold.

Not Passed: A bill known as the "Simpson" bill was introduced, which would have removed the authority for the supervision by the Board of Pharmacy of country storekeepers selling drugs and medicines by providing that all merchants and storekeepers throughout the State could sell drugs, poisons, and medicines in original packages, if such packages bore the label of a licensed pharmacist.

Not Passed: An anti-cocaine bill which placed the power for its enforcement in the hands of the State Pharmaceutical Association, and received the endorsement of that body.

Passed: What is known as the "pre-requisite" bill was passed by the New York Legislature, and is the first enactment requiring graduation from a college of pharmacy as one of the requirements of an R. P. certificate. Technically, it was an amendment to the existing law, and the text is as follows:

SECTION 1. Subdivision six of section one hundred and ninety-four of chapter six hundred and sixty-seven of the laws of nineteen hundred, is hereby amended so as to read as follows:

Subdivision 6. Except as specified in a preceding section no person shall be granted a license as a licensed pharmacist, until he shall have made written application to the board, setting forth by affidavit that he is of the age of twenty-one years or upwards, that he has had at least four years' practical experience where drugs, medicines and poisons were dispensed and retailed, and prescriptions compounded, of which experience one year must have been had within the five years last preceding the date of such ap-

plication in a pharmacy, or store in the United States under the personal supervision of a licensed pharmacist (and until he shall have presented to said board of pharmacy a certificate of the regents of the university of the State of New York, showing that he has satisfactorily passed a regents' examination in subjects to be designated by said board of not less than twelve counts, or has an education considered and accepted by the regents as fully equivalent; and until he shall have presented to the said board the diploma of any pharmacy school, college or department of a university maintaining a two-years' course in pharmacy, and upon the request or with the approval of said board registered by the regents of the university of the State of New York as maintaining a proper pharmacy standard and as legally incorporated, and until he shall have paid such license fee as is fixed by said board not exceeding the sum of ten dollars and until he shall have passed an examination satisfactory to said board for the granting of such license.

SECTION 2. This act shall take effect January first, nineteen hundred and five.

Passed: An act to amend the penal code which was in effect an act to regulate the issue and redemption of trading stamps. (A recent judicial decision by the Supreme Court of the State has declared this act unconstitutional.)

OHIO.

Not Passed: A bill known as the "Brawn" bill, placing the enforcement of the poison law in the hands of the State Food and Dairy Department.

Not Passed: A "proprietary medicine formula" bill, providing that the formula of all proprietary medicines should be printed upon the label of each package.

Not Passed: A bill providing that wholesale dealers in proprietary medicines containing more than ten per cent. of alcohol should pay an annual tax of \$500, and that the retail dealers should pay \$50 for the same privilege.

Not Passed: A bill was introduced providing: "That it shall be unlawful for any person to erase, alter, mutilate or otherwise change any figures, words, marks or signs placed upon a box, barrel, bottle, jar, package or other thing containing any article protected by a patent, copyright or trade-mark, or of misrepresenting or concealing the origin of the contents thereof, or of the original or any subsequent vendor, excepting upon the written prescription of a licensed physician, or licensed dentist, licensed under the laws of the State."

Not Passed: Two bills of like import that were designed to regulate the issue and redemption of trading stamps.

We append herewith a tabulation of the statistics of registration in the various States and territories, from the Boards of Pharmacy of which were received replies in response to our appeal for information.

It is hoped that the secretaries of the various boards that have not heretofore assisted by furnishing the data that is only procurable through their co-operation, will appreciate the value to all engaged in the consideration of the affairs of this Section of having in the compact limits of such a publication as the Proceedings of the American Pharmaceutical Association such statistical information, and furnish it promptly upon the form sent them:

REGISTRATION STATISTICS, 1903-1904.

STATE.	Total on Rolls.		Registered During Year by Examination.		Registered During Year Without Examination.				Graduates on Roll.	Women on Roll.
	R. P.	A. P.	R. P.	A. P.	As Graduates in Pharmacy.	As Graduates in Medicine.	For Other Reasons.	Assistant Pharmacists.		
Alabama	1183		68			11				
Arkansas	736		53		3		7			2
California	*12761	1811			26		16			
Colorado	*1800	152								
Connecticut	1900									
Delaware	233	53	32	4	17	12	3		51	3
District of Columbia ..	1927									
Florida	875		41		12	29	15		*100	5
Georgia	1600		66							
Idaho										
Illinois	4875	903	165	98						
Indiana	3604	364	62	20						
Iowa	13830	*15								
Kansas	11494	150								
Kentucky	1810		48							*10
Louisiana	1257	362	20		13		6			*15
Maine	1642	116								
Maryland	992	207	31	19						27
Massachusetts	4348		132							
Michigan	3331	402	170	128						
Minnesota	1442	211	77	96			7			*35
Mississippi	*1015									
Missouri	*15551									
Montana	*262	*16								
Nebraska	*1403									
Nevada	64						7		3	
New Hampshire	724	108	11	4						2
New Jersey	1924	65	150	25						12
New Mexico	134	3	22		5		17			1
New York	12586	495	314	165						
North Carolina	612		52			24			50	2
North Dakota	400	129	47	10						1
Ohio	3439	700	126	97						
Oklahoma	434	1	58		3				26	9
Oregon	683	104	34	18						
Pennsylvania	5694	2580	275	229					2650	72
Rhode Island	310	189	1	24						4
South Carolina	*1300									
South Dakota	574	26	66	14					108	5
Tennessee	1261	83	27	18				9		18
Texas	*1590									
Utah	*2811	145								
Vermont	1364	11								
Virginia	*1250	1250								
Washington	1625	*150								
West Virginia	*1338									
Wisconsin	1618	461	67	73						46
Wyoming										
Totals										

* Estimated.

† So-called Druggists.

‡ Number given last year.

W. L. CLIFFE, Secretary.

On motion of Mr. Ward, of Denver, the report was ordered received and referred for publication.

Mr. Beringer, seconded by Mr. Kirchgessner, moved that this Section endorse the Mann Bill before Congress, and that the Committee on National Legislation be requested to co-operate in every way possible to secure its passage. Answering a question by way of information from Mr.

Hallberg, the mover of the resolution explained that this bill as it now stands after modification allows the granting of a process-patent, but not a product-patent, and requires that the article or substance shall be manufactured within a certain length of time, otherwise the patent becomes invalid; also, it does not permit a patent to a foreigner where his own country refuses him a patent on the same thing, or where such country refuses a patent to a citizen of the United States for a similar article.

Mr. Ward proposed by way of amendment that the Section recommend to the Association the endorsement of the Mann Bill, and the motion was so put and carried.

The Chair called for a report from the Special Committee on draft of Anti-Narcotic Law. Mr. Beal, Chairman, said he had been fortunate in having with him on the committee two associates who had given an immense amount of study to this subject, but that they did not present their report as a perfect draft, and he hoped the members would not hesitate to criticise it. He said the aim of the committee had been to make the law as simple as possible, and to avoid extremes—to make it a law capable of enforcement. He then read the following:

REPORT OF THE COMMITTEE ON DRAFT OF AN ANTI-NARCOTIC LAW.

The Committee to which was referred the draft of the Model Anti-Narcotic Law provisionally adopted at the meeting of the Association at Mackinac Island in 1903, respectfully submit the following report:

In its revision of the draft the committee has endeavored to be governed by the considerations mentioned in the preface to the draft as originally submitted. With this end in view they have sought to avoid extremes, to make the draft clear and definite in its provisions, and capable of enforcement if enacted into law.

The Committee wishes to make acknowledgment for valuable suggestions received from J. Winchell Forbes, of Cincinnati, O., Springer Claybaugh, of Uniontown, Pa., and to Hon. Thompson D. Healea, of Tuscarawas County, Ohio, Bar, for his counsel, and for the use of his splendid law library, also to Mr. H. B. Mason, of the Bulletin of Pharmacy, and to many others. The Chairman of the Committee also wishes to make a special acknowledgment of the aid and assistance rendered by his colleagues, Messrs. C. S. N. Hallberg, Chicago, and E. G. Eberle, Dallas, Texas.

A BILL

TO PROVIDE AGAINST THE EVILS RESULTING FROM THE TRAFFIC IN CERTAIN NARCOTIC DRUGS, AND TO REGULATE THE SALE THEREOF.

Be it enacted, By the General Assembly of the State of ———:

SECTION 1. That it shall be unlawful for any person, firm or corporation to sell, furnish or give away any cocaine, heroin, alpha or beta eucaine, opium, morphine, chloral hydrate, or any salt or compound of any of the foregoing substances, or any preparation or compound containing any of the foregoing substances or their salts or compounds, except upon the original written order or prescription of a lawfully-authorized practitioner of medicine, dentistry, or veterinary medicine, which order or prescription shall be dated and shall contain the name of the person for whom prescribed, or if ordered by a practitioner of veterinary medicine, shall state the kind of animal for which ordered, and shall be signed by the person giving the prescription or order. Such written order or prescription shall be permanently retained on file by the person, firm or corporation who shall compound or dispense the articles ordered or prescribed, and it shall not be recomounded or dispensed a second time except upon the written order of the original prescriber for each and every subsequent compounding or dispensing. No copy or duplicate of such writ-

ten order or prescription shall be made or delivered to any person, but the original shall at all times be open to inspection by properly authorized officers of the law. *Provided*, however, that the above provisions shall not apply to preparations containing not more than two grains of opium, or not more than one-eighth grain of morphine, or not more than two grains of chloral hydrate, or not more than one-sixteenth grain of cocaine, in one fluid ounce, or if a solid preparation, in one avoirdupois ounce. *Provided*, also, that the above provisions shall not apply to preparations containing opium and recommended and sold in good faith for diarrhoea and cholera, each bottle or package of which is accompanied by specific directions for use, and a caution against habitual use, nor to liniments or ointments when plainly labeled "for external use only." *And provided* further that the above provisions shall not apply to sales at wholesale by jobbers, wholesalers and manufacturers to retail druggists, or qualified physicians, or to each other, nor to sales at retail by retail druggists to regular practitioners of medicine, dentistry, or veterinary medicine, nor to sales made to manufacturers of proprietary or pharmaceutical preparations for use in the manufacture of such preparations, nor to sales to hospitals, colleges, scientific or public institutions.

SEC. 2. It shall be unlawful for any practitioner of medicine, dentistry, or veterinary medicine to furnish to or to prescribe for the use of any habitual user of the same any cocaine, heroin, alpha or beta eucaine, opium, morphine, chloral hydrate, or any salt or compound of any of the foregoing substances, or any preparation containing any of the foregoing substances or their salts or compounds. And it shall also be unlawful for any practitioner of dentistry to prescribe any of the foregoing substances for any person not under his treatment in the regular practice of his profession, or for any practitioner of veterinary medicine to prescribe any of the foregoing substances for the use of any human being. *Provided*, however, that the provisions of this section shall not be construed to prevent any lawfully-authorized practitioner of medicine from furnishing or prescribing in good faith for the use of any habitual user of narcotic drugs who is under his professional care such substances as he may deem necessary for their treatment when such prescriptions are not given or substances furnished for the purpose of evading the provisions of this Act.

SEC. 3. Any person who shall knowingly violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction for the first offense shall be fined not less than \$25.00, nor more than \$50.00, and upon conviction for a second offense shall be fined not less than \$50.00, nor more than \$100.00, and upon conviction for a third and all subsequent offenses shall be fined not less than \$100.00, nor more than \$200.00, and shall be imprisoned in the county jail for not more than six months. It shall be the duty under this act of all judges of the courts of common pleas in this State, at every regular term thereof, to charge all regularly impaneled grand juries to diligently inquire into and investigate all cases of the violation of the provisions of this act, and to make a true presentment of the persons guilty of such violations.

SEC. 4. In any proceedings under the provisions of this act, the charge may be brought against any or all of the members of a partnership, or against the directors or executive officers of a corporation, or against the agent of any partnership or corporation.

SEC. 5. This act shall take effect, and be in force from and after the — day of — 19—.

J. H. BEAL,
C. S. N. HALLBERG,
E. G. EBERLE.

After a series of motions had been made by Messrs. Mayo, Eccles and Hallberg, none of them pressed to a vote, Mr. J. K. Lilly, of Indianapolis, said he did not believe a discussion of the matter would result in any improvement on the work of the committee, which had given it careful consideration, and moved that the report be simply received and adopted, and referred for publication in the Proceedings, without discussion. Mr. Ebert seconded this motion. After remarks by Messrs. Ford, Hays, Hallberg, Beal, Ebert, Mayo and Lilly, all directed to the question of the proper manner of disposing of the report, the motion of Mr. Lilly to receive and refer was put and carried.

After Mr. Hynson had called particular attention to a paper he had prepared for this Section, and asked as a special favor that the members would carefully read it when it was in print and give it serious thought, the chair called for the nomination of officers of the Section for the ensuing year. Mr. Ebert nominated Mr. Cliffe, the present Secretary, for

Chairman, but Mr. Cliffe promptly declined, giving as a reason that a press of other duties would make it impossible for him to serve. Mr. Eccles then nominated Mr. Mason to succeed himself as Chairman. Mr. Ebert then inquired of Mr. Cliffe if he would accept the office of Secretary again, and upon receiving an affirmative answer, he placed him in nomination for that office. Thereupon, Mr. Hynson nominated Mr. Caswell A. Mayo for one of the Associates on the Committee; Mr. Berger, of Florida, nominated Mr. F. C. Godbold, of New Orleans, and Mr. Eccles nominated Mr. Francis B. Hays, of New York.

In the absence of the author, the chair called on Mr. Geo. M. Hoyt, of Massachusetts, to read a paper Mr. C. F. Nixon had prepared for presentation here. Mr. Hoyt read the following:

A HISTORY OF THE MASSACHUSETTS LAW GIVING THE BOARD OF PHARMACY SUPERVISION OVER DRUGGISTS' LIQUOR LICENSES.

BY C. F. NIXON,

Secretary of the Massachusetts Board.

The writer is just concluding his term of five years' service as a member of the Massachusetts State Board of Pharmacy, two years of which he has served as president and two as secretary. He is, therefore, conversant with all of the facts, and the opinions here to be expressed are the results of personal experience. I think I should add that this paper is written at the request of the Chairman of the Section on Education and Legislation, and is not the result of malice aforethought.

The law herein discussed was enacted by the Legislature in 1894. How came it to be enacted? To the proper understanding of the matter, it should be said that the sale of intoxicating liquor in Massachusetts is governed by a local-option law. Each city and town votes each year "Yes" or "No" on the question, "Shall the city or town grant licenses of the first five classes to sell intoxicating liquors?" The sixth class, or druggist's license, is not affected by this vote; the license is granted by the Board of Aldermen or License Commissioners of Cities, and by the Selectmen of towns. Regarding local option, Boston always votes "Yes." Many of the smaller cities and towns vote irregularly, and others constantly vote "No."

The sixth class or druggists' license allows the sale of intoxicating liquors for "medicinal, mechanical and chemical purposes" under numerous restrictions, one of which is that the purchaser shall sign a certificate stating the purpose of use, residence, etc. The fee is one dollar annually. It will be seen that this license gives great opportunity for excessive liquor selling without committing a technical violation of the law, and also for direct violation without much danger of detection.

In 1894 there were over 1800 drug stores in the state, a large percentage of which could not exist without their liquor sales. This was especially

true in no-license communities. Drug stores were owned by wholesale liquor dealers; a drug clerk and a few tincture bottles were used as a shield from the law, and local political influence was employed to procure the much-coveted license. In some instances a room would be a liquor saloon in a license year and a drug store in a no-license year by the simple change of paraphernalia, in either event being owned by the same parties!

The purpose of the law of 1894 was to take the granting and supervision of these sixth class or druggists' licenses as far as possible out of the influence of local politics.

What Movement was Behind the Proposal of this Law? There was a strong feeling among right-minded pharmacists and the public at large that the sale of liquors in drug stores should be curtailed and controlled by state authority, but the man active in crystallizing these sentiments was Mr. S. A. D. Sheppard, of Boston. For a long time he had been considering the results of our local-option law and its temptation to druggists to do improper liquor selling. The Board of Pharmacy was purely an educational body but he saw no other place to put the responsibility and therefore directed his thoughts along that line.

He made a draft of a proposed bill embodying his ideas on the subject and showed it to Mr. Henry Canning, who was the only person consulted. The latter warmly approved the measure, whereupon Mr. Sheppard took it to his local representative in the Legislature, Mr. E. J. H. Estabrook, of Newton, who became greatly interested in the subject and introduced the bill in the House. It was largely through his efforts that it became a law in practically the words of Mr. Sheppard.

There was not the opposition to the enactment of the law that might have been expected. What there was came from druggists, some of whom were no doubt afraid of the consequences, but there were others who believed that it would put too much power into the hands of the Pharmacy Board—power that might be abused.

The original Act, Section 1 of Chapter 435, Acts of 1894, was as follows:

No license of the sixth class, described in section ten of chapter one hundred of the Public Statutes, shall hereafter be granted to any person who is not a registered pharmacist, actively engaged in business on his own account, nor to any such registered pharmacist unless he shall present a certificate from the State Board of Registration in Pharmacy stating that, in the judgment of said Board, he is a proper person to be entrusted with such license, and that the public good will be promoted by the granting of said license; provided, however, that any registered pharmacist may be considered a proper person to receive such a certificate when no complaints have been made against the applicant for such certificate, and when complaints are made they shall be in writing, specifying the reason, if any, why a certificate should be withheld.

In 1896 the pharmacy laws of the State were codified, and in Chapter 397, Section 9, the following provision was added to the old law:

If the full Board sitting at such hearing shall find that the person complained against

is guilty of the acts charged against him, said Board may suspend his registration as a pharmacist, and his certificate thereof, for such term as the Board in their judgment, after due consideration of the facts, may deem for the best interest of the public, or may revoke it altogether, but the license or certificate of registration of a registered pharmacist shall not be suspended or revoked for a cause punishable by law until after conviction by a court of competent jurisdiction.

It will be noticed that in the Acts of 1896 the Board had power to suspend or revoke altogether a druggist's certificate or registration as a pharmacist.

In 1901 an act was passed (Chap. 522, Sec. 1) in which the words "revoked altogether" were stricken out, leaving the Board power to suspend for a given time, but strangely enough there was no provision up to this time in our laws whereby a vote for suspension or revocation by the Pharmacy Board could be reconsidered, and there was no power outside of the Board that could pass upon its action or nullify it. In 1902, at the instigation of the writer, an Act was passed (Chap. 321, Sec. 1) giving the Board power at any time to reconsider its action and its determination, as justice might require.

There has been, and always will be, criticism of the Board's action in the enforcement of the liquor law, and several attempts have been made to have the measure repealed. It is safe to prophesy, however, that the state will never repeal it while the only demand for such action comes from druggists who chafe under the proper enforcement of the act.

In reading the Massachusetts law it should be noted that the Board grants two entirely distinct certificates: first, "certificates of registration" on examination, and second, "certificates of fitness" granted annually for the procurement of the sixth-class liquor license. No liquor license can be granted a druggist by the local authorities without this certificate.

How has this Law Worked in Practice, and has it been a Benefit to True Pharmacy in the State? As already stated, there were in 1894 over 1,800 drug stores in the state; to-day, ten years later, notwithstanding the great increase in population, there are but 1,530. The number of stores closed by the action of the Board in the first year of the operation of the law was 103. The total number closed to October 1, 1903, after nine years of the law, was 422.

Number of complaints investigated to October 1, 1903.....	1023
Number of prosecutions.....	455
Number of convictions.....	397
Number of "certificates of registration" revoked.....	28
Number of certificates suspended.....	101
Number of revoked certificates restored.....	6
Number of suspended certificates restored.....	2
Number of "certificates of fitness" refused.....	1319

Many of the 397 persons convicted were unregistered partners or clerks, who could not be dealt with by the Board.

By reading the statutes it will be seen that the Board has no police functions, and that its principal work in this direction is to investigate complaints, and, in case of direct violation of the law, to report the same to the proper prosecuting officer. It may also be stated that, in its judgment, the Board may refuse to grant the annual "certificate of fitness."

The result of this work has been to improve greatly the conditions that existed ten years ago, but there is still constant violation of the law, and perhaps always will be. Should the law be repealed, however, I believe that the number of stores would increase twenty-five per cent. in a year's time; and how any pharmacist who is not a violator of the law can desire this class of added competition is beyond my ken! And yet we find many who are constantly clamoring for the law's repeal.

The writer recently asked Mr. Sheppard for his opinion of the law after its operation for ten years, and his reply is as follows:

"I believe it is one of the best laws on the statute books of Massachusetts, and that so long as the local-option law is in force in this state, some such legislation is an absolute necessity. And I do not think any other body of men could handle the subject so well as the Board of Pharmacy."

I heartily endorse this expression; and, as I am soon to leave the Board, I think I can properly make this statement.

The last question asked by your Chairman is, "Would you recommend the same law for other States?" If other States grant licenses similar to our sixth-class license, I most certainly would. But the Board should have more power in the direction of obtaining evidence than the Massachusetts Board enjoys.

Our Board has one agent to investigate complaints and visit the stores of the whole State. No member of the Board or its agent can inspect a store, even the liquor-record books, except he may do the latter if he be also a justice of the peace. We should have more agents with police rights. The large number of druggists who are constantly working to deprive the Board of its one agent is a strong argument for additional ones.

I do not believe, however, in the sixth-class license of this State. It may be right in principle but is wrong in practice, and puts a premium on dishonesty. I believe that the greatest boon for legitimate pharmacy would be to eliminate the liquor business entirely from drug stores except in the compounding of medicines, and I further believe that this condition will exist in Massachusetts in the near future.

So much of the Massachusetts laws as pertains to the sixth-class license, and the jurisdiction over the latter by the Board of Pharmacy, is appended herewith:

MASSACHUSETTS LAWS BEARING UPON THE SUBJECTS DISCUSSED.

(Chapter 76, Revised Laws.)

Section 16. The board shall hear all applications by registered pharmacists for the

granting of sixth class licenses, if a hearing is requested by the applicant, and all complaints made to them against any person registered as a pharmacist charging him in his business as a pharmacist with violating any of the laws of the commonwealth, the enforcement of which is under the supervision of the board of registration in pharmacy, and especially of the laws relating to the sale of intoxicating liquors; or engaging with, or aiding and abetting, another in the violation of said laws; or, if he himself is not the owner and actively engaged in such business, with suffering or permitting the use of his name or certificate of registration by others in the conduct of the business of pharmacy. Such complaint shall set out the offense alleged and be made within fifteen days after the date of the act complained of. The Board shall notify the person complained against of the charge against him and of the time and place of the hearing at which he may appear with his witnesses and be heard by counsel. Three of the members of the board shall be a quorum for such hearing. Witnesses at hearings before such board shall testify under oath and may be sworn by a member of the board. The board shall have power to send for persons and compel the attendance of witnesses at said hearings.

Section 17. If the full board sitting at such hearing finds the person guilty, the board may suspend the effect of the certificate of his registration as a pharmacist for such term as the board fixes, but the license or certificate of registration of a registered pharmacist shall not be suspended for a cause punishable by law until after his conviction by a court of competent jurisdiction.

Section 19. The board shall investigate all complaints of the violation of the provisions of sections ten to twenty-three, inclusive, and report the same to the proper prosecuting officers, and especially investigate and cause to be prosecuted all violations of section twenty-one to twenty-nine, inclusive, of chapter one hundred.

Section 21. A registered pharmacist against whom a complaint or charge is pending before the board, or his counsel, shall have the same right of access to documents in the possession of said board as a person who is charged with crime in the courts of the commonwealth would have to documents in the possession of the clerk of the court or of the prosecuting officer.

(Chapter 100, Revised Laws.)

Section 21. Druggists and apothecaries may sell pure alcohol for medicinal, mechanical or chemical purposes; and wholesale druggists and apothecaries may also sell liquor of any kind, not to be drunk on the premises, under a license of the fourth class.

Section 22. No license for the sale of spirituous or intoxicating liquors, except of the sixth class, shall be granted to retail druggists or apothecaries. One or more licenses of the sixth class shall be granted annually by the licensing board of cities, or by the mayor and aldermen of cities having no such boards, or by the selectmen of towns, to retail druggists or apothecaries who are registered pharmacists actively engaged in business on their own account, upon presentation to the licensing board of the certificate of fitness prescribed by the following section, if it appears that the applicant is a proper person to receive such license, and is not disqualified to receive it under the provisions of sections fifty-three and fifty-four. A registered pharmacist who owns stock to the actual value of at least five hundred dollars in a corporation which has been incorporated for the purpose of carrying on the drug business, and who conducts in person the business of a store of such corporation, shall be considered as actively engaged in business on his own account and as qualified to receive a license for such store.

Section 23. The board of registration in pharmacy may, upon the payment by an applicant for a license of the sixth class of a fee of not more than one dollar, issue to him a certificate, which shall not be valid after one year from its date, stating that in the judgment of said board he is a proper person to be entrusted with such license and that the public good will be promoted by the granting thereof. Any registered pharmacist

against whom no complaints have been made to said board may be considered a proper person to receive such certificate. If complaint is made, it shall state in writing the reason why a certificate should be withheld.

Section 24. A license of the sixth class shall be null and void without any process or decree, if the registered pharmacist to whom it has been granted ceases to conduct his business in person and on his own account, or upon the revocation of his certificate of registration as a pharmacist, unless the registered pharmacist has become unable to so conduct his business or has died, and his business is continued by his wife, widow, executor or administrator under another registered pharmacist.

Section 25. Retail druggists and apothecaries shall not sell intoxicating liquor of any kind for medicinal, mechanical or chemical purposes except upon the certificate of the purchaser, which shall state the use for which it is wanted, and which shall be immediately cancelled at the time of sale in such manner as to show the date of cancellation. They shall not, when making such sales upon the prescription of a physician, be subject to the provisions of the second clause of section seventeen.

Section 26. Every retail druggist and apothecary shall keep a book in which he shall enter, at the time of every such sale, the date thereof, the name of the purchaser, the kind, quantity and price of said liquor, the purpose for which it was sold, and the residence by street and number, if there be such, of said purchaser. If such sale is made upon the prescription of a physician, the book shall also contain the name of the physician, and shall state the use for which said liquor is prescribed and the quantity to be used for such purpose, and shall be cancelled in the manner before provided with reference to certificates. Said book shall be in form substantially as follows:

Date.	Name of Purchaser.	Residence.	Kind and Quantity.	Purpose of Use.	Price.	Name of Physician.
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The certificate mentioned in the preceding section shall be a part of said book and shall not be detached therefrom, and shall be in form substantially as follows:

Certificate.

I wish to purchase and I certify that I am not a minor and that the same is to be used for Mechanical, Chemical, Medicinal purposes. (Draw a line through the words which do not indicate the purpose of the purchase.)

Signature.....

Cancelled.....

Section 27. The book, certificates and prescriptions provided for in the two preceding sections, and the book provided for in section thirty-two shall at all times be open to the inspection of the licensing board in cities having such boards and in all other cities and towns, to the inspection of the mayor and aldermen, selectmen, overseers of the poor, sheriffs, constables, police officers and justices of the peace.

Section 28. Whoever makes or issues a false or fraudulent certificate or prescription referred to in sections twenty-five and twenty-six shall be punished by a fine of ten dollars.

Section 29. Whoever, not being a registered pharmacist, procures a sixth-class license for the sale of intoxicating liquors in the name of a registered pharmacist who is dead, or in the name of a registered pharmacist by borrowing, hiring or purchasing the use of his certificate and who being himself the owner or manager of the place, shall himself or by his servants sell intoxicating liquor, shall be punished by a fine of not less than fifty nor more than five hundred dollars, and by imprisonment for not less than one nor more

than six months. The provisions of section ten of chapter two hundred and twenty shall not apply to such sentence.

Section 17. (Paragraph 4th.) That liquor shall not be sold or delivered on the licensed premises to a person who is known to be a drunkard, to an intoxicated person, or to a person who is known to have been intoxicated within the six months last preceding, or to a minor, either for his own use, the use of his parents or of any other person, or, unless upon the prescription of a duly registered physician, to a person known to have been supported in whole or in part by public charity at any time during the twelve months last preceding the date of the license.

(Chapter 321, Acts of 1902.)

Section 1......If the full board sitting at such hearing finds the person guilty, the board may suspend the effect of the certificate of his registration as a pharmacist for such term as the board fixes, but the license or certificate of registration of a registered pharmacist shall not be suspended or revoked for a cause punishable by law until after his conviction by a court of competent jurisdiction. The Board may at any time in its discretion reconsider its action in cases where it has suspended or revoked the license or certificate of registration of a pharmacist, and may change its determination as justice shall require.

Mr. Ebert moved to receive the paper just read, and refer for publication.

Replying to a question by Mr. Eccles as to the source of the funds used in making prosecutions under this law, Mr. Hoyt said that the Massachusetts Board received one dollar for each certificate to do business under the act, and that all the money received from this source, examinations and everything else, goes into the State Treasury; then the ways and means committee makes a specific appropriation, so much for expense, so much for agents, and so on, and the Legislature makes an appropriation every year.

MR. SHEPPARD: I would like to call attention to one fact for a moment. If you get the conditions that exist in Massachusetts, with a local-option law and sixth-class license combined, the result is simply inevitable, and you will have exactly the conditions we have in Massachusetts—it is simply human nature—and put a premium on dishonesty. The retail liquor dealer is tempted beyond his power to bear temptation. Take a local-option law and couple it with a cheap, sixth-class license, and the result is absolutely inevitable; you can't prevent it. Don't do it!

Mr. Candidus said he thought the suggestion at the end of the report was the best, to eliminate the liquor business from the drug stores.

The chair called for the reading of a paper by Mr. Ogier as particularly appropriate at this time, and Mr. Ogier came forward and read the following:

RECIPROCAL REGISTRATION: IS IT PRACTICABLE?

BY W. R. OGIER.

Some good things have been said in favor of reciprocity in the registration of pharmacists. When considered simply as a theory the arguments advanced in favor of the proposition are not easily controverted. But the difficulties in the way of putting it into effective and equitable operation are so numerous that small promise is given for its speedy accomplishment. A few of these are suggested :

1. State laws relating to pharmacy differ in essential particulars, many of them radically. Nor is uniformity in these laws in sight, for the reason that there is small agreement among pharmacists themselves on vital points, and they are the ones who must take the initiative in such a movement. Experience has also shown that legislative bodies are not to be counted upon to make laws to order on any given subject.

2. There is reason to believe that the opinions of members of boards of pharmacy, in so far as they have been formed at all, have not crystallized toward a uniform agreement for reciprocal registration.

3. Boards of pharmacy change their personnel so frequently as to preclude any settled policy on important questions.

4. Under the imperfect, not to say vicious, system by which some boards of pharmacy are created and perpetuated, it is not to be expected that the best qualified men for this important position are to be obtained with the result that the sort of examinations prepared by what are regarded as our best boards are far from ideal.

5. If, by extraordinary effort, a superior board is obtained for any State, its labor in securing for the citizens of such State a class of pharmacists of more than average qualifications may be largely nullified when men registered in other States with a lower standard are admitted on certificates, and this objection will not be obviated by uniformity in legislation.

6. There is some room for belief that the methods of some boards in passing candidates for examination are not always above suspicion. One or two men on any board of pharmacy who have lax notions as to their responsibility or are amenable to improper influences may succeed in passing unfit candidates. This is bad enough for a single state, and it ought not to be made possible to afflict forty other commonwealths in like manner.

7. With all our assertions of national unity, the United States is but a federation of many sovereignties. The autonomy of the states is recognized as paramount in the complete system of state governments, legislative, judicial, executive. Each makes and executes laws for the government of its own citizens and the supremacy of these is universally conceded except in those rare instances wherein some state enactment comes in collision with fundamental principles inimical to national unity and stability. This idea, call it what you will, is so deep seated as to operate unfavorably

upon any plan of interstate registration based upon justice and equality. To illustrate, why does the agreement for interstate registration now existing between boards of pharmacy in a few states provide a standard for candidates in excess of the grade by which the candidate was passed in his own state?

8. The best pharmacists are not nomads, and the agitation for reciprocal registration does not emanate from this class. The public well-being is best conserved, and professional standards are maintained at a higher average point, by requiring those who are much "on the road" to submit to frequent examination.

9. It is not a difficult matter for a well qualified pharmacist of good standing in any state, when finding it necessary to remove to another state, to demonstrate his competency to the members of any board of pharmacy competent to discharge its duties, without undergoing a severe ordeal; and all others should be required to pass a rigid examination.

10. Prolonged discussion of the policy of reciprocity in certificates to teach in the public schools has not developed any satisfactory plan by which a school teacher licensed in one state may be given like privileges in another state without examination.

11. No evidence of moral character is required by any state law or any board of pharmacy, so far as this writer is aware, and there is growing complaint from pharmacists of the incompetence of clerks through intemperate habits. Such complaints are the most grievous which reach boards of pharmacy, and while interstate registration would not change this state of affairs, nevertheless the narrower the field of action possible to men unfit to practice pharmacy through immoral practices, the sooner they may be eliminated entirely from the ranks of pharmacists. This objection might be overcome by requiring preliminary evidence of moral character, if such evidence would be of any practical value.

The first step towards reciprocal registration should be taken in a spontaneous effort towards uniformity in pharmacy laws by displacing in each state existing acts with those similar to the model pharmacy law approved by the American Pharmaceutical Association in 1900. To accomplish this, however, will require many years of patient waiting and unremitting effort, for reasons which are patent to all those who have had experience with legislative bodies. With this attained it may then be possible to secure a working basis agreeable to all state boards upon which a certificate of registration obtained by examination in one state may be accepted in any other state as evidence of the holder's competency to practice pharmacy.

But there must first be a far more settled conviction among pharmacists of the necessity of reciprocal registration than has as yet been made manifest.

Mr. Ebert, in moving to receive and refer the paper for publication, took occasion to compliment the author upon the good, sound common-sense he had displayed in his treatment of his subject.

Mr. Eccles and Mr. Lemberger both said the paper was conclusive upon the subject.

Upon motion of Mr. Mayo, the Section then adjourned.

SECOND SESSION—THURSDAY MORNING, SEPTEMBER 8, 1904.

The second session of the Section on Education and Legislation was called to order by Chairman Mason at 10:15 a. m., in the banquet-room of the hotel.

Mr. Cliffe, Secretary, started to read the minutes of the first session, when, on motion of Mr. Wilbert, their reading was dispensed with.

The chair stated that the next order of business was the election of officers for the ensuing year, and that, under the By-Laws, further names could be offered, the nominations at present being Mr. Harry B. Mason for Chairman, Mr. W. L. Cliffe for Secretary, and Messrs. C. A. Mayo, F. C. Godbold and F. B. Hays for Associates. Mr. Mayo wanted Mr. Hallberg to accept a place on the Committee, as a representative of the teaching faculties of the colleges, but Mr. Hallberg declined, inasmuch as he had in the past filled similar places on the Section committees, and himself put in nomination Mr. J. T. McGill, of Vanderbilt University, Nashville, as an eminently well qualified man for the place. Mr. Mayo withdrew his own name in favor of Mr. McGill, and moved that Mr. Hallberg cast the vote of the Section electing the five gentlemen now in nomination to the offices indicated. Mr. Wilbert seconded this motion and it prevailed. Mr. Hallberg cast the ballot, and declared Mr. Harry B. Mason, of Detroit, duly elected as Chairman; Mr. W. L. Cliffe, of Philadelphia, as Secretary, and Messrs. Francis B. Hays, of New York; J. T. McGill, of Nashville, and F. C. Godbold, of New Orleans, as Associates.

The chair stated that as there were no committees to report, the reading of papers would be the next order, and called on Mr. McGill to present his paper on Degrees Conferred by Colleges of Pharmacy, which he did:

WHAT DEGREES SHOULD BE CONFERRED BY SCHOOLS OF PHARMACY?

BY J. T. MCGILL.

One of the questions that should engage the attention of the conference of faculties is, what degrees should be conferred by schools of pharmacy, and what should be required for these degrees? The question will be settled best by agreeing upon the degrees to be conferred and making the requirements for the same degrees, wherever conferred, stand for approximately equivalent work. In summarizing the names of the degrees con-

ferred by only forty-eight schools of pharmacy, together with the most important requirements for obtaining them, I recognize the incompleteness and deficiencies of the statement, but I believe it is sufficiently comprehensive and exact for my purpose—to indicate what is needed to be done to bring about greater uniformity.

The degrees now offered by the various schools are Graduate in Pharmacy, Pharmaceutical Chemist, Bachelor of Pharmacy, Master of Pharmacy, Doctor of (or in) Pharmacy, Bachelor of Science in Pharmacy, and Master of Science in Pharmacy.

Thirty schools out of the forty-eight confer the degree of Graduate in Pharmacy—Ph. G. The time required varies from forty to seventy-two weeks, the average being about fifty-four weeks and comprising two sessions. Eighteen of the thirty require experience in a drug store—generally four years.

Twenty schools confer the degree of Pharmaceutical Chemist—Ph. C. The requirements are more uniform than for Ph. G. With three exceptions, no experience in a drug store is required. The time is generally two sessions of thirty-six weeks each—above this in four and below it in two schools.

Five schools confer the degree of Bachelor of Pharmacy—Phar. B. Four of these confer it instead of Ph. G. when the candidate has had no experience in a drug store. One grants it for a year's work after taking the Ph. G. degree.

Nine schools confer the degree of Master of Pharmacy—Phar. M. One of these confers it as its only degree ; six for one year's work after taking the first degree, and two bestow it upon graduates of five years' standing on presentation of a satisfactory thesis.

The degree of Doctor of Pharmacy—Phar. D., is conferred by twelve schools. Two of these confer it as their only degree ; six as a higher degree requiring from seventy-five to eighty-four weeks of work ; two upon graduates of five years' standing who present a satisfactory thesis, and one for two years' work after taking the Ph. C., or one years' work after taking the Pharm. M. degree.

Eight schools offer the degree of Bachelor of Science in Pharmacy, B. S. Phar., with requirements the same as are demanded of other bachelors of science who take a professional degree. Two of these schools offer Master of Science in Pharmacy, M. Sc. Phar., for an additional year's work. Doubtless the other six would be willing to do the same.

In considering the foregoing statement, we note several things in favor of the degrees Ph. G. and Ph. C. :

1. They are conferred by a larger number of schools than other degrees.
2. They are the most characteristic of the degrees ; for the others include the words "bachelor," "master," or "doctor," titles that are primarily academic, but are used to some extent also in the professions of law, medicine and theology.

3. These degrees are already correlated, Ph. C., with few exceptions, being given for about one session of work more than Ph. G.

4. The qualifications for Ph. C. are nearly uniform in the different schools, and those for Ph. G. are not so unequal, that they might not be approximately equalized without detriment or serious inconvenience to the majority of reputable schools.

For these reasons it appears that these two degrees might well be retained and their requirements defined. A school of pharmacy could confer either or both according to its facilities.

Should the titles "bachelor," "master" and "doctor" be used by schools of pharmacy in conferring degrees? These titles have been employed to some extent by what may be termed the major professions, law, medicine and theology; and the order of their grade in these as well as in non-professional schools is from bachelor, the lowest, to doctor, the highest. The colleges and universities have pretty well agreed on the courses of study, as four years for the rank of bachelor, five for that of master, and seven, including research, for that of doctor. While the qualifications for degrees in the United States are low in many institutions, the professions of law, medicine and theology in the last few years have made rapid progress towards a higher standard. It will not be many years before no reputable school will dare to confer the degree of Bachelor of Law, Bachelor of Medicine or Bachelor of Divinity upon a candidate who has not first taken a baccalaureate degree. (Instead of "Bachelor of Medicine" I should perhaps say "Doctor of Medicine," as custom in the medical profession in the United States has made that the only degree.)

Now, how does the educated world regard the conferring of the degree of Bachelor of Pharmacy, Master of Pharmacy, or Doctor of Pharmacy upon a young man who has not had even a high school education, and whose professional education is limited to a short course in a few branches of science pertaining to pharmacy? Such cheapening of these time-honored titles lowers the estimation in which the profession of pharmacy is held by educated people. The conferring of the degree of Bachelor of Pharmacy, Master of Pharmacy, or Doctor of Pharmacy for a course of study not more extensive than is usually required for the degree of Ph. G. (and all of these things are done by one school or another) should be discouraged. If these titles are used at all, let them be reserved for those whose education is not below that generally recognized as a requisite for a baccalaureate degree.

This is not as hard to do now as it was a few years ago. If three or four years of study of Latin and Greek in a preparatory school, followed by four years more of it in college, were necessary now (as it was, not many years ago) for a baccalaureate degree, not many young fellows of scientific turn of mind, having decided to make pharmacy their profession, would go through such a course of study for the sake of becoming a Bachelor, Master,

or Doctor of Pharmacy. But such is not the case. Through the elective system of studies almost universally adopted now by colleges and universities, a baccalaureate degree can be gotten by pursuing a course of study non-classical and largely scientific. Even professional studies are allowed now in many institutions, so that almost a whole year's work bearing directly upon the profession selected may be included in the course. Hence it is that several schools of pharmacy now offer the degree of Bachelor of Science in Pharmacy and, for an additional year's work, Master of Science in Pharmacy. Consistently the master's degree might be followed by Doctor of Science in Pharmacy for further work, especially in the line of research.

While it is proper, and indeed desirable, that graduates in pharmacy who have a baccalaureate degree be given a distinctive title, it is questionable whether a modified B. S. is the most suitable, especially as the tendency now is away from the multiplication of academic degrees back to the B. A., M. A., and Ph. D. degrees given with a liberal use of electives. A better plan, it may be, is to confer the degree of Phar. B. upon graduates in pharmacy who have taken a baccalaureate degree, and the degrees of Phar. M. and Phar. D. for the completion of certain prescribed additional work. The plan suggested is in outline :

Ph. G. for the shortest course for graduation, minimum of about forty-eight weeks.

Ph. C. for the longer course for graduation, minimum of about seventy-two weeks.

Phar. B. for Ph. G.'s or Ph. C.'s who have a baccalaureate degree.

Phar. M. and Phar. D. for Phar. B.'s on the completion of certain prescribed additional work.

It would be simpler—possibly wiser also—to offer only one degree after Phar. B., preferably that of Phar. D., or to offer only one degree in place of three, preferably Phar. D.

For the sake of simplicity in this discussion the length and number of sessions have been taken as a standard of measurement ; but it is of course understood that there are other things to be considered, such as the number of hours of lecture and laboratory work. I do not anticipate that what I have suggested will be accepted without amendment, but it may serve as a basis of discussion. No one can propose a plan entirely acceptable to all, or probably even to a majority of the schools ; but a committee on courses of study and degrees ought to be appointed to report at the next annual meeting.

Any reasonably high standard set for the lowest degree given will be beyond what is now required by a considerable number of schools. But are the faculties of these schools thus to be enjoined from teaching when, as they claim, and doubtless correctly so, they do much good by putting instruction within the reach of drug clerks who otherwise would never have such an opportunity? What are such faculties to do? The answer

is continue to do good by giving the instruction, but cease to do harm by conferring a degree. Under these circumstances the conferring of a degree is injuring the cause of pharmaceutical education by lowering its standard, and it is weakening the character of the recipient by encouraging and strengthening his vanity. Such schools should be satisfied with giving a certificate that will aid the young man to get advanced standing in some school properly equipped for giving a thorough course.

The main points in this paper are : Some schools confer degrees for an amount of work too small to deserve a degree. There are too many different degrees conferred by schools of pharmacy. There is a tendency to confer the Bachelor's, Master's and Doctor's degree upon men who have not had an educational training sufficient for a baccalaureate degree. This tendency should be checked. While the Conference of College Faculties is seeking to secure uniformity in entrance requirements and courses of study, it should also endeavor to reduce the number of degrees and make the requirements for them uniform.

Mr. Hallberg moved to receive and refer for publication.

Mr. Kremers said he thought the paper was an admirable one, and called attention to the fact that the simplifying of degrees was already going on. He explained how a mistake had occurred in the wording of the degree—due to a clerical error—when the University of Wisconsin first offered the degree of Bachelor of Science in Pharmacy, away back in 1892, which error had been copied by other universities, although corrected by the Wisconsin University itself, which no longer gives that degree, but gives the degree of Bachelor of Science only, the graduate receiving that degree having added in his degree that he has taken the pharmacy course. Mr. Kremers then went on to explain the significance of the degrees of Bachelor of Arts, Bachelor of Science and Doctor of Philosophy, as now given in the leading universities, the first referring to the cultural course, the second to the professional course and the last constituting the highest degree conferred. He said he was glad a paper of this kind had been brought before the Section. Last year the papers were all practically on legislative matters, and there was scarcely a paper on education.

Mr. Schneider thought that the question of conferring titles should be left to those a little better qualified than the public. He said a committee of five should be appointed to consider this paper and make a recommendation to the Conference of Pharmaceutical Faculties. Mr. Wilbert said he would second this motion.

Mr. Hallberg suggested referring the paper itself to the Conference of Faculties for consideration.

Mr. Wilbert was opposed to undue haste in this important matter. It would be impossible for a committee to do justice to the subject in the

short space of fifteen or twenty minutes—or even that many days. The proposition required serious consideration, and the obtention of various opinion. It should be ascertained what other countries are doing, for instance. In England to-day they are discussing educational matters right along these lines. He approved the motion of Mr. Schneider to appoint a committee to consider the matter thoroughly and make report next year.

Mr. Sayre thought it might be well to refer the matter both to the Conference of Pharmaceutical Faculties and to a committee—the latter to carry out the suggestion made on page 4 of the paper, that a committee on courses of study and degrees be appointed, to report at the next annual meeting.

Mr. Eccles offered an amendment to the effect that the committee be selected from the professors of five separate colleges, as the men most competent to pass on the question.

Thereupon, the motion of Mr. Schneider as amended by Mr. Eccles was put to a vote and carried.

The Chair called on Mr. Hynson to read his paper on the subject of a commercial course in colleges of pharmacy. Mr. Hynson, before reading the paper, suggested that Mr. Frank G. Ryan should be christened the Father of Commercial Courses in Colleges of Pharmacy, and that a debt of gratitude was due him for his introduction of such a course in the Philadelphia College of Pharmacy some years ago. He then read his paper as follows :

THE PRACTICAL DETAILS OF A COMMERCIAL COURSE IN A COLLEGE OF PHARMACY.

BY HENRY F. HYNSON.

The Chairman of a Section of this Association is, as he should be, responsible for the matter that is brought before it, and the writer has been quite willing to be led by the able gentleman here presiding, since to follow his leading, I honor myself and put upon him the responsibility for, at least, the caption and arrangement of this paper.

He asks for : “A contribution giving the *practical* details of the course, as worked out. Not a paper urging the step by other colleges, nor one treating argumentatively of its necessity, but one stating, for instance :

“How much time is devoted to the work.”

“How the time is divided.”

“How much stress, relatively, is laid upon the didactic and laboratory features.”

“Which of these is more productive of results,” and

“What particular things the students are required to do.”

Although the authorities of the institution with which I have the honor to be connected have not been consulted, it is hoped no liberty has been taken with them in attempting to give this information.

TIME DEVOTED.

The course covers one-half of a regular session of thirty-two weeks. Three hours, twice each week for sixteen weeks, ninety-six hours in all, are spent in trying to give students sufficient fundamental knowledge of business doings,—enough commercial practice to enable them to meet the requirements of the vocation they have chosen,—and in manual training, along pharmaceutical lines.

TIME DIVIDED.

At each meeting with the students, from one-half to one hour has been devoted to what is intended to be a very practical talk ; outlining and describing the work to follow. These talks, as often and as fully as may be, have been illustrated by black-board forms and diagrams and by demonstrations. This would indicate, and properly so, that about two-fifths of the time is used in didactic and the balance in individual instruction and practice. In this latter work, the very necessary and valuable aid of an assistant has been enjoyed.

RELATIVE VALUE OF METHODS.

This can scarcely be estimated from the special plan of instruction followed. Very little of it is the conventional didactic. The one is made to fit into the other or to fill in, where practice is impossible. Often the hour is spent in announcing principles underlying the practice offered ; indeed, it would be quite difficult to separate the two or to successfully conduct the one without the other.

WHICH MOST PRODUCTIVE OF RESULTS ?

The foregoing would seem to answer this, and yet the "material" acted upon has most to do with results. With the brighter students, best results are secured from the combination of the didactic with the practical, while the dull student, of course, can be helped along only when you are near him and instructing him alone. By many students a proper entry, for instance, will be made upon verbal directions ; in others, it is almost a matter of tracing it while holding the student's hand. The question of justice in the distribution of time to the members of an average class is one that must often trouble the conscientious instructor. Shall all share alike or should those most in need receive most ?

EQUIPMENT.

Before taking up the chairman's suggestion for the last and most comprehensive division, a few words may be interjected concerning what may be, as it has been, in one instance, at least, a matter of some moment regarding the equipment for the course. Especially is this important if either space or expense, or both of these, must be considered. The

pharmaceutical laboratory, as generally arranged in colleges, with its conventional counters, shelving and lockers, answers admirably for manual training, for the acquirement of strictly pharmaceutic technique. Each locker should be fully supplied with dispensing utensils, with all kinds of boxes, bottles, corks, papers, twines, etc. These counters, however, will not answer for desks upon which the students may write. The chairs of a lecture-hall, if supplied with a rest on one of their arms, answer nicely for commercial practice. The chairs must not be placed too closely together, and each student should be supplied with a good, wide and strong "clip board." This latter is sufficiently wide to support his papers, and the clip holds all in place, especially when it is necessary to place them in a locker. Each student should be required to have a good fountain pen, and there must be sufficient desk room, supplied with rulers, red ink and pens, at which a few at a time may rule up their work. Book-keeping paper, ruled for the several books, may be had at any good stationery store, and this should be supplied students in liberal quantities. A full set of bound books, sufficiently large to hold their finished work, is generally bought by each student; they cost from thirty to forty cents only. Some students, as all might, make their books out of the paper supplied. Check books, which can be separated into parts of several sheets each, may be had, for small accounts, or some enterprising bank will be glad to supply them as an advertisement. Bank notes, drafts, and receipts are in stock at stationers; bill heads and letter heads are inexpensive or the student may make them, which is very good practice. A large black-board is essential; upon it forms of books may be readily ruled by using red and blue crayon. It is easily understood that white crayon serves for black ink. Upon this same board impressive forms of commercial paper and correspondence may be written to be analyzed. It is a good plan to have students do this work, while the class criticises.

THE PARTICULAR THINGS STUDENTS ARE REQUIRED TO DO.

As requested by your Chairman, I am pleased to state that they are required to :

- Write letters.
- Practice penmanship.
- Order goods.
- Make invoices.
- Check off invoices.
- Mark goods.
- Deduct discounts.
- Keep a set of books.
- Manage a bank account.
- Draw checks.
- Indorse checks.

Make drafts.
Draw notes.
Indorse notes.
Compute interest.
Estimate discounts.

SOME OF THE ITEMS IN WHICH STUDENTS ARE INSTRUCTED.

In order named: Salesmanship, and counter service; selling stamps; making change; drawing soda-water; selling cigars, brushes, combs, tooth-brushes, toilet articles, perfumery, sponges.

Wrapping, tying and sealing packages, bottles, jars, etc.

Varieties of paper, twine, bottles, corks, boxes.

Proper and specific names for common things.

Quantities and how to order.

Selection of stock.

Care and arrangement of stock.

Importance of records.

Principles of bookkeeping.

Bookkeeping and accounts.

Accounts with departments; cigars, soda, expense, merchandise, etc.

Banking, currency.

Handling cash.

Responsibility of endorsements.

Payments of accounts; discounts.

Beginning business.

Location.

Capital.

Backing.

Credit, loans, security.

Collateral.

Commercial agencies.

Credit men.

Contracts.

Partnership.

Inventories.

Closing books.

P. & L. account.

First, make the clerk, then the proprietor.

In natural sequence, first the clerk is instructed, then the owner or manager. In the very beginning of the course, the person, his general education and his character are considered from a strictly business point of view. Matters of carriage, cleanliness, dress, speech, manners, orthography, grammar, composition, honesty, truthfulness, fairness, activity, are put before the students, while all through the course effort is made to

thoroughly familiarize them with the application of principles and the use of common sense and good judgment, with the earnest hope that by the little leaven the whole may be leavened in time.

Mr. Hynson exhibited some books kept by a student in this course.

On motion of Mr. Kremers, the paper was ordered received and referred for publication.

Mr. Puckner then read the following, at the request of the chair :

THE CONSIDERATION OF ALKALOIDS IN SCHOOLS OF PHARMACY.

W. A. PUCKNER, CHICAGO.

In discussing the composition or nature of alkaloids, text-books on pharmaceutical chemistry generally state that they are basic substances found in plants, and are either *amines*, and contain carbon, hydrogen and nitrogen, or else *amides*, and contain carbon, hydrogen, nitrogen and oxygen; and that they show their derivation from ammonia in their power to combine with acids without the elimination of water. When discussing the properties of alkaloids, the division into amines and amides is again emphasized, the former being considered oxygen-free and volatile, while the latter are said to contain oxygen and be not volatile; and that alkaloids combine with acids without the elimination of water is repeated. When enumerating the alkaloidal precipitants, such as iodine, phosphomolybdic acid, potassium-mercuric iodide, gold chloride, etc., no mention of the composition of the precipitates so obtained is ordinarily made.

In the following I beg leave to discuss (1) the desirability of discarding the division of alkaloids into amines and amides; (2) the advantage of bringing out more clearly the similarity of the properties of ammonia and the alkaloids, and to advocate the elimination of statements to the effect that alkaloids unite with acids without the elimination of water, and (3) the advantage of bringing out more prominently when treating of the precipitants for alkaloids, the relation of alkaloids to the alkali metals in their chemical properties. And, finally, I desire to propose a more rational plan of naming alkaloids and their salts.

1. Considering amides as ammonia in which hydrogen has been replaced by an acid radicle or acyl group with the elimination of water, and therefore containing a carbonyl group attached to nitrogen, thus $RCONH_2$, it is rather difficult to see how such alkaloids as atropine, cocaine and morphine, the structure of which is fairly well known, can be called amides. And what is more important, the alkaloids just named possess many properties which the student, when considering other amines, has been led to consider typical of amines; and then to call them amides must certainly be confusing, hence the division could well be dropped.

There is also some objection to the division of alkaloids into the oxygen-free, volatile, liquid alkaloids, and the solid, non-volatile alkaloids containing oxygen, because it is liable to leave the impression that the solid state

of the oxygenated alkaloids is due to their oxygen content, and because liquid alkaloids containing oxygen are known.* Also it does not place the structurally closely-allied alkaloids, coniine and piperine † in the same class.

2. When, in the regular sequence, ammonia is taken up for consideration, it is fully explained that the formation of ammonium hydroxide is assumed when ammonia gas dissolves in water, and that then the addition of hydrochloric acid results in the formation of a salt with the elimination of water, that here as elsewhere alkalinity is due to hydroxyl ions, and that the addition of the acid brings about a union of these hydroxyl ions with the hydrogen ions of the acid. To illustrate the similarity of the NH_4 group to the metals, attention is then called to the nomenclature, that ammonia becomes ammonium to show the basic nature of the group, and later the ammonium salts are considered along with the sodium and potassium salts. By the time the student takes up the organic alkalies, the amines and alkaloids, he is thoroughly familiar with the chemistry of ammonia and ammonium compounds, and yet text-books, after calling attention to the similarity to ammonium compounds, persist in stating that these bodies combine directly with acid to form salts without the elimination of water. Would it not simplify things very much if it were stated that the alkalinity of amines and of alkaloids is also due to hydroxyl, and that these hydroxides react with acids to form salts, *i. e.*, just as the anhydride (?) ammonia reacts with water to form ammonium hydroxide, and as this may react with hydrogen chloride to form water and ammonium chloride, so alkaloids react with water to form alkaloid hydroxides which react with acids to form salts. Or, in equations, if $\text{NH}_3 + \text{H}_2\text{O} = \text{NH}_4\text{OH}$ and $\text{NH}_4\text{OH} + \text{HCl} = \text{NH}_4\text{Cl} + \text{H}_2\text{O}$, why not for atropine, $\text{C}_{17}\text{H}_{23}\text{O}_3\text{N} + \text{H}_2\text{O} = \text{C}_{17}\text{H}_{24}\text{O}_3\text{NOH}$ and $\text{C}_{17}\text{H}_{24}\text{O}_3\text{NOH} + \text{HCl} = \text{C}_{17}\text{H}_{24}\text{O}_3\text{NCl} + \text{H}_2\text{O}$?

Further, why not say that just as ammonia becomes ammonium hydroxide from which ammonium chloride, bromide, sulphate, etc., are derived, so atropia becomes atropium hydroxide, and this forms atropium chloride, bromide, sulphate, etc.? The adoption of such an ending would avoid confusion with the hydrocarbons of the acetylene series where the ending "ine" is used to indicate a "triple" bond; it would at once indicate the basic or positive nature of the vegetable alkaloids; it would bring the nomenclature of the alkaloids into entire harmony with that of the inorganic salts, and once and for all do away with the equally inconsistent terms morphine chlorate, morphine hydrochlorate, and morphine hydrochloride.

* Pictet-Wollfenstein (Die Pflanzenalkaloide, 2d edition) mention arecoline, hygrine, pelletierine and methylpelletierine as being liquid and containing oxygen.

† While piperine is often considered a "neutral principle," teachers will no doubt still consider it along with other bases derived from pyridin.

3. When treating of alkaloidal precipitants the bare statement only is often made that alkaloids form insoluble precipitates with phosphomolybdic acid, potassium-mercuric iodide, iodine, etc., without in any way indicating the chemical nature of the precipitate. Or, still worse, it is stated that alkaloids are precipitated by Mayer's, Wagner's, Dragendorff's or Sonnenschein's reagent without a word regarding the chemical nature of the reagent. And it seems a pity that the student is obliged to learn a series of alkaloidal reagents or precipitants as isolated facts, when a brief reference to similar reactions previously considered would at once give him a clear idea of the nature of the precipitate so formed. Such a presentation would permit a review of many reactions which the student is now ready to understand fully, and at the same time be the best possible argument for a systematic consideration of chemical facts.

The following illustrations will make clear my meaning: When considering the precipitation of alkaloids by means of Sonnenschein's reagent, it has been my practice to recall the identification and separation of phosphates by means of ammonium molybdate T. S., and to remind the student of the general composition of the precipitate, to state that its composition is not sufficiently definite to be used in quantitative estimations, and that it is insoluble in acids, whence its use in the analysis of calcium phosphate, etc. Then, having stated that potassium phosphomolybdate is similarly insoluble, while sodium phosphomolybdate is soluble, and having noted the general resemblance of ammonium salts to the corresponding potassium salts in their solubilities, I have brought out that alkaloids, resembling ammonium salts in so many ways, also form insoluble alkaloid phosphomolybdates, and that these precipitates closely resemble ammonium phosphomolybdate in nearly every way. Again, instead of permitting the student to gain the impression that the "periodides," obtained by adding Wagner's reagent to solutions of alkaloidal salts, are an entirely new and distinct class of bodies, I have taken pains to explain that the reagent is the regular decinormal volumetric iodine solution, made by dissolving iodine by the aid of potassium iodide and containing potassium triiodide, KI_3 , or KI_5 , that sodium and ammonium form similar triiodides, and that alkaloids form compounds similar in every way, except that they usually contain a larger proportion of iodine, and hence are called periodides, as, for example, morphium periodide ($C_{17}H_{20}NO_5I_3$ or $C_{17}H_{20}NO_5I_4$).

On motion of Mr. Hallberg, the paper was received and referred to the Publication Committee.

The chair apologized to Mr. Hynson for his oversight in not calling for discussion on his paper. The gentleman assured him it was all right.

Discussing Mr. Puckner's paper, Mr. Koch, of Pittsburg, spoke of the troubles of students who had been properly taught upon the subject of the alkaloids when they go before boards of pharmacy and are asked as to the

two classes of alkaloids. They are completely nonplussed. He saw no way to avoid this difficulty, and had hoped that Mr. Puckner might give some solution.

Mr. Kremers thought that the fact that others might do wrong was on justification for wrong-doing on the part of teachers. If students cannot pass board examinations without answering foolish questions, let them fail ! That is the solution.

The chair requested Mr. Schneider to read a paper he had prepared for this Section, and he presented the following :

THE APPRECIABLE ADVANTAGES OF HIGHER AND UNIFORM
ENTRANCE REQUIREMENTS TO COLLEGES OF PHARMACY.

BY ALBERT SCHNEIDER.

It is generally conceded that, other things being equal, the individual with the higher and broader educational attainments is better qualified to fight life's battles, will make a better citizen and serve his fellow-men more efficiently than the one who is educationally inferior. It is true we have with us a disgruntled minority who will argue concerning useless or so-called impracticable education ; and a useless waste of time and money on intellectual attainments, for which there is no visible return value represented by dollars and cents. That some of the mental gymnastics practiced in colleges, universities and other institutions of learning may be unimportant, irrelevant or even wholly undesirable, is not denied, but such a condition is certainly not the rule. In a general way the educational system of the day, with all of its defects, does improve the individual. In this day and age of specialization and specialists it is well to caution against a marked tendency to neglect the educational groundwork for the specialty. Too many believe themselves qualified to do advance or research work in various lines of intellectuality without having laid the foundation sufficiently broad and deep. This condition of affairs is responsible for the vast army of narrow-minded cranks and hobbyists who parade as specialists. To illustrate, the chemist who knows naught of botany, zoölogy, poetry, fiction, art and music, cannot be at his best. The physician who knows naught outside of medicine can know but little about his profession and cannot be a competent or reliable practitioner. The lawyer who knows nothing but law books would certainly be a poor judiciary or interpreter of the law. The pharmacist who knows nothing outside of pharmacy would be an unreliable dispenser of medicines. In simple words, a broad, educational groundwork should be laid before the specialty is entered upon. We need not present arguments in favor of this, because it is admittedly true.

As far as the above statements apply to pharmacy, it need only be stated that many papers and discussions have been presented, from time to time, before the American Pharmaceutical Association, the general tone

of which favored a raising of the educational standard, both as to the entrance requirements to colleges of pharmacy and requirements for graduation. This advice has been freely given, but only a few colleges have had the courage to put it into practice. But, it is these few colleges that have demonstrated that it is entirely feasible and practicable to raise the entrance requirements considerably above the average now demanded by the majority of the colleges of pharmacy. It may be stated that the colleges referred to as having raised the entrance requirements considerably are those which have been requiring, and do now require, one, two and four years of accredited high school work, as a minimum preparation for entrance. These colleges are in existence and are prospering in every way. It only remains for all colleges to unite and adopt some uniform and decidedly raised standard for admission. A set of resolutions drafted to this end will be presented for action before the Conference of Pharmaceutical Faculties.

There being no ground for discussion as to the desirability of higher pharmaceutical education or the feasibility of putting into practice such advanced standards, I wish simply to refer briefly to a few marked improvements which would result from advanced requirements for admission.

In the majority of colleges of pharmacy the entrance requirements are comparatively low, usually designated as "a good common school education." Here the following conditions may be noted: The majority of students have never had any high school training; some have done high school work, varying from one year to graduation; a few are college, or even university, graduates. From this it is evident that there is great variation in the mentality of individual students, which the teachers must average up as best they can, in the students as a class. As a result, the educationally better qualified students are, or must be, held back by check-reins, metaphorically speaking, in order that those who have had only a common school education (and usually they finished this work years ago and have forgotten all about it) may be pulled forward. This is decidedly unfair to the former students and tends to overtax the latter. The attempt to average up the intellectual differences of these extremes causes the teacher much worry, much extra labor, and causes, furthermore, more or less dissatisfaction among the students themselves, to say nothing of unsatisfactory results represented by the work of the average of the student body. The following illustrations will explain this difficulty.

We will imagine that we have a mixed class as stated above. The teacher calls for a definition of light, refraction, chromatic aberration, or asks what are the primary colors, or some other question pertaining to optics. Three or four of the entire class of say forty students will answer intelligently, some have only hazy ideas on the subjects, while the majority have not the faintest idea what is up for consideration. The best that the

teacher can do is to go back to the physics of the primary grades or the kindergarten in order that the majority may have some conception of the physics of light and its relation to the optics involved in microscopy. Again, topics are assigned for theses, full suggestions are given as to how to begin and carry on the work. Weekly (or oftener) sessions are held to compare notes, report progress, and for discussion. A few students will be competent to prepare a creditable thesis which will represent a certain amount of original research, while the great majority will be wholly unable to make progress without the constant help of the teacher. This constant attention the teacher cannot give, and furthermore, the work done under such circumstances would not represent original work. These and other difficulties will come to the notice of the teacher of such colleges.

In colleges of pharmacy in which the uniform entrance requirements are high, there will be noticed a marked contrast. In making these comparisons I wish to state that I believe that the general intellectual capacity of students is approximately the same throughout the United States. I do not believe, for example, that the youth of one state are intellectually stronger than the youth of another state, so that that factor may be left out of consideration entirely. It will be a most agreeable surprise to find how the work of a teacher will be greatly simplified; there will be greater harmony throughout in the work of students as well as the work of teachers. The students progress quite uniformly as a class; it will not be necessary to apply the check-reins to some and push others. The teacher can apply his special methods to the students as a class. When it is required to prepare theses it will indeed be gratifying to find how well and uniformly they progress, and at the end of the year they will hand in theses which are really a credit to the students and to the institution with which they are associated.

The conclusion which may be reached is that the differences in the work of students referred to above, is essentially due to the difference in the entrance requirements of colleges of pharmacy.

San Francisco, California, July 10, 1904.

Mr. Beal was asked to present a paper he had prepared bearing directly on the same subject. Mr. Beal said his paper might be regarded as heretical from the standpoint of many educators, and he was almost afraid to read it, and had requested the Chairman to let it be read by title. He had arrived at a different conclusion from that he had started out with, which was that all applicants for admission to colleges of pharmacy should have not less than a high school education. After considering the subject more thoroughly he was constrained to change his mind somewhat, and the title of his paper accordingly. He then read his paper in abstract, the full text being as follows :

THE REQUIREMENT OF HIGH SCHOOL GRADUATION BEFORE ADMIS-
SION TO COLLEGES OF PHARMACY, AND OF COLLEGE GRADU-
ATION BEFORE ADMISSION TO THE PRACTICE OF
PHARMACY.

J. H. BEAL, SCIO, OHIO.

The requirement of a high school education for students preliminary to their admission to colleges of pharmacy, and the requirement of graduation from a college of pharmacy before their registration as pharmacists, are two questions so closely connected with each other that they are of necessity considered together.

That many of those who annually seek admission to our colleges of pharmacy are indifferently prepared by their previous education to enter intelligently upon the pharmaceutical curriculum is a matter of common knowledge, though it must be admitted by all who have kept close watch upon such matters that for some years past there has been a noticeable improvement in the preliminary educational qualifications of the matriculants at the colleges of pharmacy, and that the general average of preliminary education among pharmacy students is considerably higher than it was some years ago.

Nevertheless, there remains much room for improvement, and the quite too general lack of preliminary preparation is the greatest present defect in the system of pharmaceutical education.

With a Yankee, to see a defect is to endeavor to discover an improvement, and if possible to get a patent on it. So we have many of those who are laudably bent on improving methods of pharmaceutical education in America.

That those who propose this improvement are actuated by the most worthy motives no one can doubt; that they may meet with the utmost success must be the devout wish of all who are solicitous for the future fame of pharmacy. It must not be understood, therefore, that those are opposed to the movement who mildly inquire as to the process by which this educational revolution is to be accomplished, nor that they lack sympathy with the general purpose if they do not believe in the wisdom of some of the methods proposed.

We take it that this question is as broad as well as an important one, and that there is plenty of room for differences of opinion among men who are both honest and intelligent.

PROPOSED ACTION BY THE FACULTIES CONFERENCE.

It is proposed by some that the American Conference of Pharmaceutical Faculties shall adopt suitable resolutions providing that after a specified date no college holding membership in the Conference shall admit students to its courses who do not possess a certain standard of preliminary education, say that attested by the diploma of a high school of the first class.

Supposing such a resolution to be adopted by the Conference, what will be the result? It will be conceded that all the members of that body will either honestly govern themselves by the terms of such resolutions, or withdraw from the organization. But what will be the action of the schools of pharmacy not members of the organization? Will they be governed by the action of the Conference? Most assuredly they will not. They will applaud the action of the Conference Colleges, and complacently accept the increased attendance which will accrue to them by the closing of the doors of the other colleges upon a considerable number of students which they now admit.

The net result, therefore, will be that the colleges of the better class will have lost, while the colleges of a poorer class will have gained. Not a single poorly-prepared student will have been kept out of college. Not a single better-prepared student will be induced to take up the study of pharmacy. The same men will present themselves to the Boards of Pharmacy as before, and will be duly enrolled in the ranks of registered pharmacists, only they will have entered through the doors of inferior institutions.

Evidently, this method will not only injure the better class of colleges, but will increase the attendance and revenues of the poorer ones, and make no material difference upon the general education of those admitted to practice.

PROPOSED ACTION BY BOARDS OF PHARMACY.

But, say the enthusiastic reformers, let us appeal to the Boards of Pharmacy to support the colleges which take advanced standing in the matter of preliminary requirements. Let the boards resolve that they will not grant recognition to the students of such colleges as do not comply with the Conference requirements. This will compel students to seek graduation in the better colleges, and as the latter will see to it that only those of proper preliminary training are admitted, the reformation will be an accomplished fact.

Unfortunately there are two grave difficulties in the way of the Boards of Pharmacy coming to the rescue of the colleges in the manner proposed.

The first is that the boards will not adopt such a resolution, and the second is that they can not legally do so if they would. The law does not say that they *may* examine certain classes of candidates who come before them; it says that they *shall* do so, and if the said candidates are found competent, shall place them upon the register. They have no option as to whom they will or will not examine; except within very limited bounds, such as the age and experience requirements. Should they attempt to enforce any such unlawful regulation as is proposed they would be promptly met by mandamuses by the courts, and sundry other kinds of damuses from other quarters.

Reluctantly, we are compelled to acknowledge that neither the colleges alone nor the boards alone, nor both combined, can effect this much desired consummation. True, such schools of pharmacy as are supported from the bounty of the State can set their entrance requirements as high as they like, and it is not likely that any one will object to their doing so. The majority of colleges of pharmacy, however, do not possess the open sesame to the state treasury, and it is precisely this class of institutions that has done and is doing the greatest amount of good in pharmaceutical education, and any scheme of reform to command our support must first take into consideration the necessities and great deserts of these colleges. So, also, the boards may, within certain limits, raise the standard of their examinations and this will help some. But a thorough-going reform, such as is contemplated by those who are actively behind the movement, must be brought about in a different manner altogether.

THE EXPERIENCE IN MEDICINE AND DENTISTRY.

As an encouragement to the taking of advanced ground by the colleges of pharmacy we are cited to the sister professions of medicine and dentistry, both of which professions now require, or are supposed to require, a considerable degree of preliminary training before admission to a college of medicine or dentistry, and it is urged that what these sister professions require can also be required of students of pharmacy. Those who cite these examples forget however that neither medicine nor dentistry proceeded to advance their requirements in the same manner that pharmacy is asked to do. Before either of these professions raised the entrance requirements to their colleges, they were fortified by statutes in nearly every State in the Union, requiring every applicant for admission to the practice of medicine or dentistry to be a graduate of a reputable professional college. Had they undertaken to proceed without this legal requirement back of them, they would have failed, just as the college of pharmacy will fail if they are not supported by similar statutory provisions.

THE TENDENCY IS TOWARD THE LOWEST PERMISSIBLE STANDARD.

Regrettable as it may be, we cannot ignore the fact that the nearly universal tendency among young men is to make the minimum preparation for any calling that will admit them to that calling. The exceptions to this rule are lamentably few. If the occupation is one that makes no legal requirement of proficiency, they will stop with the least preparation that will enable them to obtain employment and receive wages. If there is a legal standard, they will discontinue their education as soon as they have reached the minimum standard. Whether this is peculiarly the fault of the American spirit which prompts young men to seek money-making employment at the earliest possible moment, or whether it is a common characteristic of human nature is not material. This disposition exists and

must be reckoned with by all schemes aimed at the reform and improvement of existing methods of pharmaceutical education.

With the majority of those who are seeking to enter pharmacy, the great object which we see and hear expressed in a hundred ways is to "pass the board." This is the beginning and the end of the ambition of a majority of those who enter the doors of the colleges of pharmacy to-day, and will likely be the controlling motive of future generations of students as well.

MANY EXCELLENT YOUNG MEN DO NOT POSSESS AND CANNOT OBTAIN A HIGH SCHOOL EDUCATION.

Still another consideration which should cause us to hesitate before taking any hasty or radical action in the matter of admission requirements, is the knowledge of the fact that many of the most celebrated and brightest names in American Pharmacy are those of men whom unfavorable circumstances compelled to enter the colleges of pharmacy with but meager general education. A high school requirement would have kept them out of the colleges of pharmacy, but would pharmacy or civilization have been the gainers thereby?

Are we to assume that such young men do not exist at the present time? If we are to do so, the assumption must be made in the face of the positive knowledge to the contrary, for every professor in a college of pharmacy must know of instances where the high school certificated student has proved the fool of his class, while some earnest boy from a humble home, without the advantages of such a training, but with a soul fired with a desire for knowledge, has carried away the honors. Should our colleges erect an insurmountable barrier to such as these? Is not one good strong heart and mind of this sort worth more to pharmacy and to civilization than a dozen weaker spirits who have been artificially crammed with the more or less useful knowledge of the modern high school curriculum?

And, finally, does not the college of pharmacy already possess the means of excluding the hopelessly unfit by refusing advancement when their work in the Junior Course shows that they are not able to properly pursue the remainder of the college curriculum. If the objection is made that some schools will ignore this duty, then I reply that the same schools would also ignore the preliminary requirement for admission if it were adopted.

CONCLUSIONS.

If the writer has not greatly mistaken the bearings of his subject, we may settle down to the following conclusions:

(1) No plan of action looking to the raising of the present standard of admission to colleges of pharmacy can be proposed which will be agreed upon and adhered to by all or even a majority of the institutions now conferring pharmaceutical degrees.

(2) If a certain number of the colleges should adopt a greatly advanced

standard. they will decrease their own attendance and increase the attendance of the colleges which do not make such advances.

(3) It is highly commendable in such institutions as are maintained by the State, and are able to stand such a loss in attendance, to raise their standards and thus set a bright and shining example for other colleges to imitate as rapidly as their circumstances will permit.

(4) In the absence of a legal requirement of graduation before registration, any general raising of the standard of admission to colleges of pharmacy, while it might keep those whose preliminary education was deficient out of the colleges, would not keep them off the roll of registered pharmacists. The Boards will still be required to examine all applicants of legal age and experience, and to admit them to the register if found competent pharmacists, regardless of the character of their general education.

(5) Without the reinforcement of a statutory requirement of graduation before admission to the roll of registered pharmacists, the good colleges would decline, and the poorer ones flourish, without any improvement in the quality of the men admitted to registration.

(6) The high school requirement rigidly and universally enforced means the exclusion from the colleges each year of some of the best and most earnest young men who, by reason of poverty or other circumstances, are unable to cease wage earning long enough to attend a high school, but whose natural qualities of mind and earnestness of purpose would enable them to complete the work of the college of pharmacy successfully.

THE RATIONAL METHOD OF REFORM.

If what has been said substantially represents the conditions which prevail, are we to consider all efforts at the higher and better education of pharmacists as hopeless, and to abandon further efforts in this direction? By no means! The argument presented here is not against rational efforts for improvement, but against putting the educational cart in front of the legislative horse. We need not rest satisfied with the existing order of things, but we should begin far enough back and near enough to the foundation of things to ensure the success of our efforts.

The rational method of procedure, as the writer conceives it, is this: To make a united, active and continued effort to procure the enactment in all the States of statutes which will absolutely require graduation from a reputable college of pharmacy before admission to the rolls as a registered pharmacist entitled to manage and conduct a drug store. From assistants and from those who do not expect to conduct a store in their own right or to act as manager for one who is not a registered pharmacist, less rigorous requirements might be enacted.

When the colleges have fortified themselves in this manner, then let us proceed to raise the standard of admission to a plane equal to that required

by any other profession. Meanwhile, let all colleges which are so favorably situated as to enable them to raise their requirements to the high school standard do so, and live up to them.

Mr. Beal's paper was greeted with applause.

The Chair said there was a third paper, one by Mr. Mayo, on the "Prerequisite Law of New York," that was *apropos*, in view of the position taken by Mr. Beal especially, and he asked Mr. Mayo to read it before discussion began. Mr. Mayo, after stating that he thought his paper more properly belonged to the Historical Section, read the following :

GRADUATION AS A PREREQUISITE FOR BOARD EXAMINATIONS.

BY CASWELL A. MAYO, NEW YORK.

The enactment by New York State of a law requiring that all applicants for registration appearing before the State Board of Pharmacy after January 1, 1905, shall be graduates in pharmacy, gives to New York the credit of being the first State in the Union in which such a requirement has been put into force.

The movement in this direction, however, by no means originated in this State. In 1891 the Pennsylvania Pharmaceutical Association adopted a resolution to the effect that "every applicant for State Board examinations should be a graduate of a reputable college of pharmacy, and produce evidence thereof before his examination." Eleven years later a graduate prerequisite bill was introduced in the Pennsylvania Legislature, but was defeated.

At the International Pharmaceutical Congress, held in Chicago in 1893, a resolution was adopted favoring the requirement of graduation prior to examination. This resolution was endorsed by the American Pharmaceutical Association in 1894, and a similar resolution was favorably acted upon by the Association in 1895. In 1895 a bill requiring that all applicants for examination as registered pharmacists should be graduates of pharmacy, passed both houses of the Louisiana Legislature, but was vetoed by the Governor.

A graduate prerequisite clause was incorporated in a proposed pharmacy law in New Jersey some six years ago, but the clause was stricken out before the measure was presented to the Legislature. No doubt other legislation along this line has been prepared from time to time, but the instances named are the only ones that occur to me.

In the state of New York the matter appears to have been first brought to public attention by a resolution presented at the Rochester meeting of the New York State Pharmaceutical Association, in 1893. This resolution provided that in the all-state pharmacy law, then being prepared with a view of securing the consolidation of the three existing boards of pharmacy, there should be incorporated a provision making graduation from a

college of pharmacy a pre-requisite to examination for a pharmacist's license. This resolution was vigorously debated, but was finally voted down. The matter was again brought before the Association in the address of the President at the Albany meeting in 1899, and the sentiment in favor of the law had evidently gained in strength, since the resolution in favor of such a law was voted down only by a small majority, and much bitterness was developed between the opposing factions. At the Newburg meeting held in 1900, a resolution was finally adopted to the effect that an effort should be made to secure legislation on the subject, with a view to having a law go into effect January 1, 1905. At the meeting held in Utica in 1903, a special committee was instructed to prepare a bill providing that all candidates for examination by the Board of Pharmacy should present a diploma from a school or college of pharmacy, requiring a preliminary examination in subjects designated by the Board of Regents of the University of the State of New York, equivalent to twelve regents' counts. This committee, after consulting with the Board of Regents, and in deference to their expressed wishes, omitted from the draft of the bill prepared by them any mention of the number of regents' counts required, it being customary to leave this matter in the hands of the Board of Regents themselves. This bill was introduced into the Legislature, but in the meanwhile another bill was introduced independently, providing for the enactment of a pre-requisite clause, and naming twelve regents' counts as being required of licensees, but without specifying as to whether the regents' examination should be taken prior or subsequent to the course in pharmacy. The introduction of this measure complicated matters somewhat, but after consultation, the two measures were practically consolidated, and a bill was passed in the form presented below :

AN ACT.

TO AMEND CHAPTER SIX HUNDRED AND SIXTY-SEVEN OF THE LAWS OF NINETEEN HUNDRED, ENTITLED : "An Act to Amend the Public Health Law and the Acts Amendatory Thereof, in Relation to Pharmacy, and Repealing Certain Sections Thereof."

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. Subdivision six of section one hundred and ninety-four of chapter six hundred and sixty-seven of the laws of nineteen hundred, is hereby amended so as to read as follows :

Subdivision 6. Except as specified in a preceding section, no person shall be granted a license as a licensed pharmacist, until he shall have made written application to the board, setting forth by affidavit that he is of the age of twenty-one years, or upward, that he has had at least four years' practical experience where drugs, medicines and poisons were dispensed and retailed and prescriptions compounded, of which experience one year must have been had within the five years last preceding the date of such application, in a pharmacy or store in the United States under the personal supervision of a licensed pharmacist, and until he shall have presented to the said board the diploma of

any pharmacy school, college or department of a university maintaining a two years' course in pharmacy, and upon the request or with the approval of said board registered by the regents of the university of the State of New York as legally incorporated and as maintaining a proper pharmacy standard, provided such pharmacy school, college or department of a university shall require as a condition for entrance a satisfactory examination in subjects designated by said regents of not less than twelve regents' counts or an educational equivalent acceptable to said regents, and until he shall have paid such license fee as is fixed by said board not exceeding the sum of ten dollars, and until he shall have passed an examination satisfactory to said board for the granting of such license; provided, however, that in place of the diploma above provided for, the said board may, in its discretion, accept the certificate of the Board of Pharmacy of any other state, issued prior to January first, nineteen hundred and five, showing that the person to whom said certificate was issued was upon an examination equivalent to any examination conducted by the said board licensed or otherwise authorized to practice pharmacy in the jurisdiction of the Board of Pharmacy issuing said certificate.

This Act shall take effect January first, nineteen hundred and five.

The law will not disqualify from examination by the Board of Pharmacy candidates who now hold diplomas, for it will be observed that it provides that a candidate for examination before the Board of Pharmacy must be a graduate from a pharmacy school maintaining a two years' course in pharmacy, provided such school or college "shall require" as a condition for entrance a regents' examination of at least twelve counts, or "an educational equivalent acceptable to the Regents." It will be noted that the law does not read "required" but "shall require."

The new law will not bar candidates from colleges or schools outside of the jurisdiction of the New York State Board of Regents, as the measure leaves to the Board of Regents the decision as to whether the entrance requirements of a college or school outside of New York State are an "educational equivalent" to the twelve counts specified in the prerequisite clause.

Furthermore, the Board of Pharmacy is authorized to accept, in lieu of a college diploma, a certificate issued to a candidate by any regular State Board of Pharmacy, showing that the candidate was authorized to practice pharmacy in the jurisdiction of the board issuing the certificate.

The Board of Regents is now engaged in collecting data as to the entrance requirements and curricula of all schools and colleges of pharmacy both in this country and abroad, so as to be in a position to judge what schools or colleges will come up to the required standard.

The meaning of the term "twelve regents' counts" as used in the New York law is somewhat vague, as it might be possible for applicants of foreign birth to pass an examination before the Board of Regents which would entitle them to twelve counts without having a working knowledge of English. No doubt this danger will be obviated by the establishment of suitable regulations by the Board of Regents somewhat similar to those established under the law enacted in 1895, which required medical students matriculating prior to January 1, 1896, to present regents' pass cards

for twelve academic counts, representing one year of academic work; twenty-four counts for matriculants prior to January 1, 1897, and forty-eight counts, representing a full high school course, for medical students matriculating after that date.

Since the graduate prerequisite law for pharmacists uses the same terms which appeared in the medical act, they will no doubt be construed in the same manner as they were construed under that law. It is also reasonable to assume that the qualifications now required for pharmacists prior to matriculation do not represent the final step, but rather the initial step, toward the requirement of still higher qualifications to be provided for in future legislation.

While this law received the formal approval of the State Pharmaceutical Association, it is quite probable that even now if submitted to a popular vote of all the pharmacists of the State it would be defeated. Notwithstanding this fact the law will undoubtedly be lived up to, for the opposition to it is for the most part passive, while the enforcement of the law will lie in the hands of those persons who have been most active in securing its enactment, and who can therefore be depended upon to see that the law is made effective.

In the four colleges of pharmacy in the State of New York the number of students who matriculated up to September 5 was considerably in excess of the number matriculating during the previous years. This showing indicates that the law is being taken into consideration by prospective applicants for registration, but it is rather interesting to note that the relative excess of matriculants is very much larger in one of the colleges which will require students matriculating now to complete their course at once than in some of the colleges which will allow students to matriculate now and take up their studies later. It should also be noted that the number of students matriculating at the colleges of pharmacy throughout the United States is reported as being rather larger than what may be considered normal. This abnormal increase is no doubt due, in part at least, to the prosperous condition of the country generally, but the enactment of this prerequisite requirement in the State of New York, and the agitation looking towards the enactment of similar laws in Pennsylvania and other States, have no doubt had some effect in bringing about this increase in the number of matriculants.

Mr. Kremers moved that the three papers be received and referred for publication.

Mr. Anderson, speaking as the representative of the New York State Association, which was the first to have a prerequisite law passed, commended Mr. Beal's ideas as the only effective way to bring about the desired reform. He said his suggestions were the most practical and logical that had ever been presented to this Association. He believed he had

sounded the keynote to the solution of this vexed problem. The right way to pass prerequisite laws, he said, was to do as they had done in New York State, where the local associations of retail druggists first took up the matter, and carried it to the State Association, and did not attempt to pass a law until the State Association had approved it, and the legislative committee of the State Association had been authorized to have it passed by the Legislature. He thought any other course would meet with utter failure. He then went on to say that he thought it was a mistake to try to make the requirement for entrance into colleges of pharmacy too high at the beginning. It is impossible for a law of that kind to be enacted and put into effect without affecting the retail drug trade; its effect upon the clerks in the retail drug trade must be considered. He illustrated by reciting the conditions as they will exist in New York State after January 1st next, and said the law would have to be tested in practical operation, and the whole situation considered, before further progress was made.

Mr. Schneider agreed with Mr. Beal in the idea that State legislation is very important, and perhaps almost necessary; but he wanted to know why this would not apply to conditions as they exist now. How many States require graduation from colleges of pharmacy before applicants can come up for registration? Still, the colleges exist. Does it follow that the colleges would go out of existence because the standard is slightly raised? It is not a question of raising them high up, but gradually. Mr. Beal seemed to be riding two unruly horses in opposite directions. On the one hand, he is in favor of a high standing, while on the other he pleads that our best men are often those who have had no preliminary education.

Mr. Sayre said he had heretofore read a paper before this Section on this subject. He entirely agreed with Mr. Beal, but wanted to emphasize the fact, by way of encouragement to pharmacists, that they had the public back of them in any effort to procure legislation of this character. He stated that as the result of an investigation of the subject he had found that the public believes that every licentiate in pharmacy is a graduate in pharmacy. It was surprising to know that the pharmaceutical profession would allow a young man to be a licentiate in pharmacy without his ever having had a school training.

Mr. Kremers could not agree with all the views of Mr. Beal, and as illustrating the proposition that an advance in the educational standard of a college of pharmacy did not mean disaster, he referred to a lecture he had heard Prof. Remington deliver when he was a student at the Philadelphia College of Pharmacy, where, in reviewing the history of that institution, he made the statement that every advance that had been made by the college was accompanied by a slight decrease in the number of students for a year or two, but that there was always a large increase thereafter. In reply to Mr. Beal's suggestion that many of the best pharmacists

we have are men who never had the advantage of a college education, he said the same statement would apply to engineering, or to the ministry, and to all the callings and professions; but that a great many business men—our great captains of industry—thought a scientific course in commerce at our universities was a good thing; it is realized by them that the days of the pioneer are over, and that, everything else being equal, the man who makes the best use of his four years at college in a course of commerce is made the better for it. He said the ambitious girl or boy would wash dishes, wait on the table, do anything for an education; and that they were made of the same stuff as the pioneers of fifty years ago, who had not such opportunities.

Mr. Wilbert said it was not likely that any other state would pass a prerequisite law under five or six years, and that the passage of the law in New York would have this effect: That no reputable college could afford to do otherwise than substantially comply with the requirements in New York, for fear of being considered a second-class institution.

Mr. Hallberg said that the work of this Section certainly proved that subjects of education and legislation were indissolubly associated. He spoke of the great advance made in the last twenty-five years in pharmaceutical education—almost as marked as that of medicine in the same time. One thing that suggested itself was, that there was no compulsory laboratory instruction in those days. For pharmaceutical legislation, however, he could not say so much, as there had been practically no progress in this respect in the last quarter of a century, particularly in some of the western states. He reviewed some of the past and present conditions, and concluded by saying that Mr. Beal's view of the matter was the *ultima thule* of pharmaceutical education and legislation, and he heartily approved of it, and hoped the Conference of Faculties and Board of Pharmacy would appoint a committee before leaving Kansas City to go over this whole question and present a definite program for action at Atlantic City next year.

Mr. Kremers then moved the following:

Resolved, That this Section recommend to the Association in general session that all members of the American Pharmaceutical Association are urged to secure, if possible, the introduction and passage of a prerequisite clause in their state laws.

The General Secretary agreed with Mr. Beal in regard to the requirements for admission, and said that he would like to see a high school education made a prerequisite to admission, but it was agreed that it was not possible now. He said that the keynote of the whole situation was to be found in Mr. Beal's suggestion, that, at the end of the junior year, the colleges of pharmacy had it in their power to get rid of undesirable material, whether the student had a high school education or not. In reply to a question by Mr. Hallberg as to where the dull students went,

he said it was known quite well where some of them went, as their names had been seen in the graduating lists of other institutions. Mr. Ebert said, "why not turn them back to the junior class." Mr. Caspari said that was done in his institution, and that the student could stay there three years, after which time he must quit. He said they had eliminated as many as eight to ten or twelve students at one session, in the junior grade, as wholly unfit for the profession of pharmacy.

Mr. Beal said he must admit that he had presented his paper in rather a shamefaced way, when he remembered that the Proceedings of past years contained papers from his pen in which he had vigorously contended for nothing short of a high-school education as a prerequisite for admission to colleges of pharmacy; and he was still in favor of that "bill of fare." His objection was, that "the roast had been put in front of the soup," and he wanted to take the items on the bill in their proper order. Another thing, he did not wish to be understood as claiming that all young men should be admitted, regardless of their qualifications; he only meant that the opening should not be absolutely closed against young men of real worth who wanted to enter colleges of pharmacy. He wanted the ambitious young fellow from the country, who had never had an opportunity to get a high-school education, to have a chance. At the suggestion of Mr. Ebert, Mr. Beal went on to emphasize and make clearer the distinction between the requirements that should be exacted of the proprietor on the one hand and the clerk on the other. There should be a far higher qualification required of the man who conducts the business, buys the goods and determines their quality.

Mr. Rowe, spoke for a uniform law for the different states, and thought this Association should help the Boards of Pharmacy in this work. He thought the colleges of pharmacy should keep out of it. He was in favor of a gradual elevation of the standard of education.

Mr. Ford, of Denver, thought there was a great deal more legislation already than was needed. The place to begin was with the colleges, who should be required to do their work right. He heartily commended the practice in the Maryland college to eliminate young men in the junior year who showed no fitness for the study of pharmacy.

Mr. Hallberg asked Mr. Ford whether, if a prerequisite law had been in force during the last ten years, he thought the Colorado College of Pharmacy would have been in existence. Mr. Ford said he thought it would.

The Chair then read Mr. Kremers' motion, preparatory to putting it to a vote. The motion was seconded by Mr. Schneider.

Mr. Rowe said he did not think too much legislation should be attempted, with the result of failure, rather than to wait until the right time to pass the right thing, and then pass it.

Mr. Mayo offered the following as a substitute motion to that of Mr. Kremers:

Moved, That the Chair appoint a committee of five, to prepare and submit a model prerequisite law, to be submitted at the next annual meeting.

Mr. Hallberg seconded this motion.

Mr. Anderson spoke for the original motion and against the substitute. He was opposed to waiting a year before taking action. He referred to the difficulties a committee would have in drafting a law to meet the varying conditions in the several states. The New York law was a gauge for other states, anyhow.

Mr. Kremers said the state association of Michigan had already adopted a resolution that they would try to procure the enactment of a prerequisite law next winter, and Minnesota had taken like action, and he thought if the American Pharmaceutical Association would back up these committees in their work it would strengthen their hands.

Mr. Mayo said that the two motions did not really conflict in any way.

Mr. Eccles said the motion of Mr. Kremers should be passed first, and then the motion of Mr. Mayo, with the proviso that the committee should be ready to extend its aid to any state that might desire before the end of a year to pass such a law.

The motion of Mr. Kremers was then put to a vote and carried.

The chair stated the effect of Mr. Mayo's motion.

Mr. Ebert thought the appointment of the committee in this way would defer action in some of the States where the legislature meets next winter, as the boards of pharmacy will wait another two years to see what action is taken.

The chair stated that it would probably be two or three years before a prerequisite law was enacted following the lines of the New York law, and it would seem desirable, therefore, that both motions should prevail.

Mr. Ebert said that not a single state had followed the model pharmacy law presented to the country by this Association in 1869, and that the New York law was a model for this class of legislation.

Mr. Wilbert said the New York law could not be used in other States as a model, as it was distinctive in having a Board of Regents, and few other States had that feature. He favored Mr. Mayo's motion.

The chair then put the vote on Mr. Mayo's motion and it was adopted.

The chair then called on Mr. George C. Reimann, of Buffalo, as Chairman of the Associated Board of Pharmacy—a result attained by a resolution adopted by this Section—to address the session.

Mr. Reimann came forward and stated that he had been appointed chairman of the Boards of Pharmacy at the Mackinac Island meeting last year, and detailed some of the work done during the year towards bringing the boards together this year for permanent organization. He said they had had their first meeting Monday night, in Kansas City, with twelve boards represented; on Tuesday, they had fifteen, and now (Thursday morning) they had present representatives from twenty-five different

boards in the United States. They had formed a permanent organization, and were now ready for work. He said he would like Dr. Murray Galt Motter, the editor of their proceedings, to give some of the details of what had been done so far.

Mr. Motter said that 16 out of the 25 boards represented at this meeting had sent delegates especially to take part in this conference, some of them with power to act, as far as possible. He said the organization had adopted the name of the National Association of Boards of Pharmacy. He said the objects were (1) to provide for interstate reciprocity in pharmaceutical licensure, and (2) to procure uniformity of legislation. The membership was to be composed of the officers and members of State Boards, and the meetings were to be held annually, during the meeting of the American Pharmaceutical Association. He gave some other details of their organization.

Mr. Wilbert moved that this report from the Boards of Pharmacy be received, and that at least some mention be made of it in the Proceedings. He said he did not know how far the Publication Committee would desire to go into the details, but he thought some mention should certainly go into the published minutes. Mr. Mayo moved to amend by extending the thanks of the Section to Mr. Reimann and the committee for their efficient work, and Mr. Wilbert said he would accept the amendment. The motion as amended was then put and carried.

The chair said there were several papers left that might be read by title and referred to the Publication Committee for action, and Mr. Wilbert so moved.

Mr. Eccles protested against being shut off from reading even the abstract of his paper on "Food Legislation as Affecting Pharmacy," and said one of the main objects he had in coming to the meeting was to present his subject. On motion of Mr. Wescott he was granted leave, and Mr. Eccles presented his abstract, the following being the full text of the paper.

FOOD LEGISLATION AS AFFECTING PHARMACY.

BY R. G. ECCLES, M. D.

It seems to be exceedingly difficult for most men to appreciate the vast amount of power that lies behind a precedent. Indeed, there are many who act as if they believed that established laws, systems and habits rested upon a web of finest gossamer that could be swept aside by a wave of the hand or demolished by a breath. Men of experience soon come to fear an established precedent that is bad while it is yet in abeyance, and to all intents and purposes quite harmless. Nowhere is precedent more forceful than in law, and therefore wise men are always conservative in everything appertaining to new legislation. Invoking the fetish of legislation to overcome defects in human nature is as old as the prayer-wheel, and quite as useless. Wisdom may rail at it, philosophers may denounce it, and

science may show its absurdity, but it is all in vain. Truly, it may be said that "Ephraim has joined to his idols; let him alone."

It is quite safe to assume that the members of the Section on Education and Legislation of the American Pharmaceutical Association are wide awake to the dangers of a bad law even if unexecuted. It is likewise safe to assume that you are all fully aware of the fact that, among the most dangerous of the tricks of legislation, so far as precedent goes, is that of legislating into words meanings which they never before bore, and that the public do not know they bear when stamping them with their approval. Every dangerous attempt at sumptuary legislation, and for that matter, of all legislation that seeks to circumvent the National or State Constitution, resorts to this trick. By stretching the meaning of some word it is an easy matter to read into a law some feature that will elude public vigilance and gain support that otherwise could not be secured. In seeking to secure strong pure food and pure drug laws, it has become customary to make a play on the meaning of the word *adulterant*. The common meaning of this word familiar to the public is any cheap substance added to a more costly one for the purpose of robbing the buyer without his knowledge. When an inferior article is added to a superior one so as to increase the profits of the seller, that is called adulterating. In every instance it is a case of adding cheap goods to dear goods, lowering the quality and cheating the customer.

Recent legislation has sought to practically reverse the meaning, and it is now possible to convict a man on the charge of adulterating because he has added a dear substance to a cheap one for the purpose of improving the quality. To improve the keeping qualities of a food by the addition of preservatives, even when the preservative is far more costly than the food itself, is branded as adulteration. The adder has no fraudulent intent when he adds it, and every element of adulterating, as generally understood, is absent from the transaction. If a dangerous antiseptic should be added, harm might come to the user, so that there can be no objection urged against laws forbidding the use of dangerous substances in foods. Such laws are wholesome and should be enforced. No one thinks of characterizing the alcohol present in a tincture as an adulterant. Why is it there? For the same reason that other preservatives are added to food. No objection can be raised in opposition to the usual food preservatives that cannot be shown to have equal forcefulness if applied to the use of alcohol in tinctures or elixirs. No advantages can be shown as due to the presence of alcohol in such preparations that have not corresponding advantages adducible for the presence of preservatives in food. It is only by classing preservatives as adulterants that the public can be led into supporting legislation against them. If they were fought on their merits as preservatives, the public would ask the evidence concerning their wholesomeness or injuriousness with seriousness. When the stigma of fraud is

put over them at the start, it becomes much more easy to get the public to condemn them for other supposed defects. A man coming before the public for trial on any charge is presumed guilty if a bad reputation has preceded him. On this principle the attempt is made to create a prejudice against all modern preservatives by classing them as adulterants, although they do not possess a single element of what the masses mean when they talk about an adulterant. That those who draw up such laws are perfectly aware of this and know what they aim at in doing it, is seen in the wording of such laws. Such and such things are said to be adulterants if they belong to a certain meaning written into the law. They are not adulterants, because they adulterate, lower the value of the goods, or aim at cheating someone. They are adulterants because they do not comply with a certain prearranged definition of the writer of the law. In other words, the law itself presumes them guilty without a trial, and condemns them after refusing them a hearing as to their merits. Is this justice? If it is, and if the precedent thus established should obtain power in any country or state dominated by ultra-temperance principles, woe betide pharmacy, for all of its galenicals would come under condemnation. The fact that there is but small danger from such a source does not alter the principle of the thing. That the precedent of reading into laws predetermined meanings is already pressing in upon pharmacists is evident in the fixing of standards of medicines by the Pharmacopœia, *without checks*. As pharacists we are standing idly by and letting this go on under our noses, and most of us seem to be unaware of the fact that its end is the Mongolizing of pharmacy. Under a rigid, unexceptional rule, progress dies and everything fossilizes. If we do not wish such an end put to modern pharmacy, we must put some mobility into every law which makes the Pharmacopœia our standard. By all means, let us adhere to it as our standard and let us adopt measures to force obedience to its mandates within proper limits, but let us stop the present dangerous plan of making it superior to better processes merely to save ourselves the trouble of fighting false claims of superiority. Every step taken with no other object in view than the *easy* conviction of the guilty, is a step nearer to the easy conviction of the innocent. This is one reason why the extreme of law is the extreme of injustice. To apotheosize the Pharmacopœia and make its mandates like those of the Medes and Persians, is as dangerous a procedure as to despise and ignore it. It would be difficult to say with certainty which, if either, is a greater evil than the other.

Besides the dangerous precedents that so-called pure food legislation is tending to introduce because of overzealousness, it is striking directly at the business of every pharmacist. That there is great need for pure food legislation, few will dare to deny. That such legislation should be fair and honest in its character is equally certain. To fair legislation of this kind no honest person will object. When a specific protest arises from a mul-

titude of honest business men against a measure, it is safe to assume that there is something wrong with it. Already the representatives of many large industries are on the alert for every new encroachment of adulteration laws not upon any fraudulent act of theirs, but upon their honest efforts at saving their customers from injury and inferior goods, made inferior through spontaneous deterioration. By stopping the laudable efforts of these men the sales of the drug store are lessened, and by seeking to enforce such measures the good name of the pharmacist, the health of his customers, and his own health, together with his liberty, are threatened. His reputation, his income, and his health are at stake on the issue. The risk to these is, of course, not vast, but it is certain. If the issue may be deemed by some a small one, it is far from being so small as to be negligible. If small leaks sink great ships, small losses, not guarded against, are likely to multiply and sink great businesses. With the growth of the antiseptic treatment of foods comes many a demand to the drug store, from the butcher shop when sausages are being prepared; from the confectionery when fruit juices are to be cared for; from the beer and soda-water bottler when putting up summer beverages; from the fruit packers when preparing pulped fruits for shipment from the orchards, and from the manufacturers of various catsups, temperance beverages and preserves. Large manufacturers probably buy their supplies directly from the jobber or wholesaler, but even they may run short betimes when they must needs patronize the retail pharmacist. Small manufacturers almost invariably get their supplies directly from the retail pharmacist. Suppression or restriction of the use of preservatives means the cutting-off or diminishing of this source of the pharmacist's income. While every pharmacist is, no doubt, quite willing to sacrifice any part of his income for the public good when it is necessary, he is not willing to sacrifice it on a whim or fad that aims at increasing some one else's income at his expense. But these laws do not stop at cutting off his sales and so diminishing his income, they strike directly at him as a purveyor of soda-water and manufacturer of his own syrups and the syrups of neighboring confectioners whom he supplies. He can be fined for supplying a glass of soda-water which contains one one-thousandth of a grain of benzoic or salicylic acid as readily as for supplying a somewhat larger but still minute amount of the same preservative in the bottled malt extracts which he sells over his counter. He must not protect his solutions of citric or tartaric acids, his pure fruit juices, or his soda-water syrups from decomposition during hot weather. The bottled juices which he buys must not contain preservatives, and if they do, even when he has been assured by the shipper that they are sterilized, he is free from preservatives, he is the sufferer if they have been misrepresented to him. With sterilized fruit juices he must either use up immediately the contents of a bottle he has opened or throw away any excess over what is then required. He must not try to save it by adding

a preservative. Such is already the law in many States, and such promises to become the law in every State if a national law of this kind establishes a precedent.

Is there any good reason for these attacks on preservatives? If there is, then it should apply to the use of alcohol in galenicals, to vinegar in pickles, to salt and smoke on meat, to glycerin and alcohol in fluid extracts, and to spices and essential oils when used with the same object. Are they poisonous or injurious to health? This, as every pharmacist must know, is a matter of dose. Those opposed to alcohol hold that in ever so minute a dose it is a poison and injurious to health, yet there are those who have become centenarians while using it. There is not in the entire list of ordinary preservatives any one of them possessing the toxic power of nicotine, and yet those who have lived to the ripest old age have been its users in the form of tobacco. People who are opposed to the use of salt denounce it as injurious in any dose. It is ever thus with people having some so-called hygienic fad. An article to them that can produce injury in immense doses must be dubbed a poison and denounced as dangerous in any dose. The preservatives in greatest demand are boric acid and borax, salicylic acid and salicylates, benzoic acid and benzoates, sulphurous acid and sulphites. The attempt at suppressing these has always resulted in forcing into the market others with far greater danger. The doses as given in the very best works on therapeutics and materia medica range from five to sixty grains. The two organic acids of this group have so high a bactericidal power that the quantity needed to preserve all the food requiring preservation, which would be ordinarily eaten by an adult in a year, would be no more than his doctor would be likely to give him in less than a week. If a year's supply can be condensed into a week's consumption without harm, and with possible benefit, what becomes of the logic that would make preservatives harmful? The therapeutic doses of tartaric, malic, and citric acids are the same as those of benzoic and salicylic acid, yet no one ever dreams of calling oranges and lemons, apples and pears, grapes and currants, poisonous. These contain as much of their respective acids as preserved foods do of the others. The dose of acetic acid is much less than that of benzoic or salicylic acids. It is a stronger and more dangerous acid, yet no one declares vinegar or pickles poisonous or dangerous to health.

Even if there was some degree of danger attached to the use of preservatives, it is easy to show that the loss of life, the loss of health and the intense suffering that multitudes are compelled to endure from the consumption of foods that, through lack of preservatives have developed deadly ptomaines, is far in excess of any theoretic suffering or injury that imagination can conjure up against preservatives. There is absolutely not an iota of evidence of any one ever having been injured by preserved foods. It is conceded that it is only fear of possible injury that inspires

the opposition. On the other side, however, the injury, the deaths, the suffering are palpable, certain, large in volume and denied by nobody. Why refrain from stopping this actual evil merely because of a suppositional evil of the existence of which there is no evidence and that, if it did exist, must be vastly less injurious than the former? When it can be shown that the checking of the use of preservatives in food keeps up the prices of all kinds of provisions, lowers the wages of workmen, lessens commerce between nations, allows of the waste of untold millions of dollars' worth of food-stuffs, prohibits the saving of perishable foods from times of plenty to times of scarcity, encourages intemperance at the expense of temperance and sobriety, and lowers the standard of public living and public health, the indictment seems strong enough to make wise men pause. Let us add to this the fact that statistics are dumb regarding any suspicion of injury from the twenty or more years' vast use of preservatives, but do show a decided squint in the opposite direction.

Without pretending to claim that the use of preservatives has any such benefit on public health, as by the theory of their use we should, *a priori*, expect them to have, there is a most remarkable conformity between the vital statistics of the United States Census of 1900 and the arrangement of things in relation to preservatives. A table is given for every one of twenty-one grand divisions into which the country is divided, that shows the number of deaths from diseases of the intestinal tract. Strange to say, in these divisions, the very regions where the laws against preservatives are most rigidly enforced, are the regions where the death-rates from these diseases are the highest. Note the fact that they are not merely high, but the highest; and not merely the highest, but most decidedly the highest. Since this is just what should happen if antiseptics are, in fact, anti-septic, and if ptomaine poisoning is lessened not only in violent but in mild cases, and if other causes are at work emphasizing results, there should be little cause for surprise. The class of diseases that attack the intestinal tract is just the class that is amenable to antiseptic treatment. Since the table is limited to this class, its figures are, to say the least, quite suggestive. When we look at the figures of regions where large amounts of preserved foods are used and find them low or high in proportion to the probable amounts, our suspicion grows stronger. When we find that each of the twenty-one regions ranges itself in an order corresponding to what we might expect if preservatives in foods actually preserve, there is, at the least, a strong tendency to disbelieve the theory that demands results of an opposite character for its confirmation. There may be other factors at work, causing this singular state of affairs, but, be the cause what it may, it is an antiseptic one, helping food preservatives in their function of keeping down germs.

The objections urged against preservatives have all hitherto been based on old theories that modern science has discountenanced. The defenders

of preservatives have depended almost wholly on experimental evidence. The chief one of these old theories, and the one that is responsible for the greatest evil in this connection is that which condemns preservatives because they can preserve. Their power of preserving food is held to be proof of their noxiousness, and on this ground salicylic acid has come in for an unusually large share of condemnation. Those who have condemned it most loudly have confessed that they did so because that in proportion to its weight it had the highest germ-destroying power of any other food preservative. Remarkable as it may appear, when stated as a detached fact, food preservatives have received condemnation directly in proportion to their virtues and benefits. The better and safer they are the worse and more dangerous they have been deemed by those actuated by an old theory of our grandfathers on which their conclusions have been drawn. If the theory is true these condemners of preservatives must be right. If the theory is false the whole structure of their condemnation tumbles like a castle of cards. That theory assumes that pepsin, trypsin, diastase, and other enzymes, are not chemical substances, but living germs that can be paralyzed by any substance that kills germs. It is unnecessary for me to stop to prove the falsity of such a theory to intelligent pharmacists. They have handled and weighed out too much pepsin to be beguiled by it. But let us study the logic of the condemners. According to the old, exploded theory mentioned, enzymes were called ferments and living germs were likewise called ferments. No distinction was made between the dead chemical body and the living, organized entity. They, therefore, argued that what would kill ferments would stop fermentation, and, conversely, what would stop fermentation would kill ferments. If we grant their premise the conclusion is inevitable. If enzymes and germs are identical, then food preservatives, by paralyzing the enzymes, must stop all forms of bodily metabolism and bring profound injury upon the body. The better the preservative the more dangerous it must be. Such a theory must grade the danger from a preservative in exact proportion to its preservative power.

On the basis of this theory legislative bodies have been led to pass prohibitive and restrictive laws that have done immense injury to every civilized community in the world. That the theory is not only false but ridiculously false, in the light of modern knowledge, it is scarcely necessary to repeat to you. Every pharmacist must know that hydrochloric acid is an excellent germ destroyer, yet so far is it from being an enzyme paralyzer that peptic digestion requires its presence to be perfectly accomplished. Every stomach of every vertebrate creature in the world is a standing evidence of the falsity of such a theory. Every drug store in the world exists because this theory is false, and not one of them could exist if it were true. The tinctures, the extracts, the syrups, the elixirs, the alkaloids, and practically every remedy sold has antiseptic power, but if this power went *pari passu* with enzyme destroying or paralyzing power, no human being would

persist in buying drugs. The very use of the word paralyzing as applied to enzymes is ridiculous, and it is only used here in such a connection because the opponents of food preservatives have popularized it with such an unreasonable meaning. A dead chemical body cannot be paralyzed. That every kind of substance has an effect upon enzymic action is true, but it bears no relation to antiseptic power. Large doses of salicylic or benzoic acid will check digestion, but so also will large doses of sugar, of starch, of alcohol, of glycerin, of peptone, and of many other substances. Even large amounts of hydrochloric acid will do the same. Small amounts of either salicylic or benzoic acids will stimulate enzyme action of any kind because they are acids, and as such favor hydrolyzation.

On motion of Mr. McGill, the paper was received and referred for publication.

Mr. Wilbert's motion to read the rest of the papers by title and refer for publication was then put and carried. Said papers here follow :

THE PHARMACIST AND THE PHYSICIAN: A NEW ASPECT OF THE CASE.

M. J. WILBERT.

Some of the articles that have recently appeared in medical, as well as in pharmaceutical, journals would appear to indicate that the relations existing between pharmacists and physicians are in an unsatisfactory and altogether unsettled condition. While it is true that the subject-matter under discussion is not new, and that many of the questions that are now involved have arisen over and over again for upwards of a century, some recent developments in connection with the trade in nostrums, or patent medicines, have added a tone of bitterness to the controversy that will not tend to bring about more amicable relations in the near future.

Unfortunately, too, there is, in nearly all of the printed articles, an evident tendency to hold up the shortcomings and frailties of a few as an evidence of the tendency and ideals of all. That there are members in both professions who do not live up to the prescribed principles or codes of ethics, and whose technical training or skill does not compare favorably with the best that is attainable, all must admit. But to say, on the other hand, that all of the members of these respective callings are guilty of any or all of the accusations that have recently been made would be overstepping the bounds of truth very materially. Over and above the evident falsity of any series of general accusations, we should always remember that crimination or recrimination will not, and cannot, of itself bring other than discredit to all concerned.

It will be much more in keeping with a genuine desire for progress, therefore, if we as pharmacists, recognizing the shortcomings of physicians, also recognize our own, and honestly strive to correct existing abuses by the gradual elimination of objectionable practices.

In the following pages I have tried to outline what I consider the underlying causes of many of the present differences of opinion, and also to indicate the position that I believe pharmacy will hold in the future. In addition to this I have attempted to indicate how we as individuals can, now and in the near future, contribute very materially to bringing about a better understanding between pharmacists and physicians, and incidentally contribute no little to a better knowledge of drugs and medicines on the part of future graduates in medicine.

The retail pharmacist of to-day occupies rather an anomalous position, being, or attempting to be, a conglomerate of small tradesman, artisan and member of a liberal profession. In this varied calling he has acquired interests which are at least partially, if not wholly, antagonistic to each other, and which have certainly tended to keep him within distinctly narrow bounds. As a professional man he has not developed as rapidly as was confidently asserted he would half a century or more ago. Among the reasons for this lack of development may be mentioned, that as a whole he has become too numerous, and that the system of education which has been provided for him is entirely too inadequate to develop the principles necessary for the evolution and growth of a professional spirit.

It should be mentioned, however, that despite the meagre training of the earlier apothecaries, or "pharmaceutists" as they were sometimes called, American pharmacy has contributed no little to the sum total of our knowledge of drugs and medicines. Such men as Procter, Parrish and Bedford, although restricted almost entirely to the limited educational facilities of the pharmaceutical schools of their day, have accomplished work that we and future generations of pharmacists may point to with pride.

It has been frequently predicted, and for apparent good reasons, that in the future economic arrangement there will be no need and no place for the retail druggist of to-day or of yesterday. Be that as it may, so far as the purely-commercial interests of the retail druggist are concerned, there can be no question regarding the necessity and consequent continuance of the professional pharmacist. With the constant increase of specialization in the practice of medicine, and the accompanying realization that the human body is not a machine and that its ills cannot well be treated on general principles, there must be an accompanying increase in appreciation of the competent pharmacist, who is willing and able to act as an assistant or adjunct to the medical practitioner. While it is true that the future pharmacist will not be as numerous as he is at the present time, he will occupy a relatively higher position in the social scale, and will in addition be in a position to accomplish much that will make him honored and respected at home and abroad.

For us as pharmacists it would appear imperative, then, that we bear this possible development along professional lines in mind and see that the

proper material is available when the expected change is brought about. The proper foundation for this rational development of professional pharmacy can be laid at the present time, and, in addition to this, we may aid in the pharmaceutical education of future physicians if we can, by any means at our command, improve the present status of hospital pharmacy in the United States. In the education of future generations of physicians, hospital training will necessarily play a most important part. Even at the present time a medical education that does not include at least some hospital experience is considered inadequate. This being true, it becomes evident at once that the impressions a recent graduate receives during his hospital experience—impressions of drugs and druggists—must be lasting ones and ones that will largely control his future ideas and practices.

How woefully deficient and unsatisfactory the drug service in many of our hospitals must be, becomes evident when we realize that in this great country, with hundreds of institutions to supply them, we have had but one solitary instance of a hospital pharmacist who has become widely known through his professional and scientific work. I refer to the late Charles Rice, of Bellevue Hospital, New York, who, I am sorry to add, was himself a foreigner by birth and early training. Compared to what has been accomplished by the pharmacists of European hospitals, particularly by those of France, this is indeed a poor showing. Much of this deficiency of the past, however, could be corrected in the future if members of this Association, who are influential in their communities, will direct the attention of hospital authorities to their shortcomings in this respect.

One of the most widespread abuses in hospital and dispensary practice is due to the fact that, apart from a rather limited number of routine stock mixtures, the medicines dispensed consist largely of proprietary preparations that have been donated by charitable manufacturers with a view to having them brought to the attention of the medical men connected with the institution and, if possible, securing from them suitable endorsements for publication. It need not surprise us, therefore, that physicians who have had hospital experience are frequently more hopelessly dependent on the use of proprietary remedies than graduates who have not had the so called advantages of a hospital training. Much of this could and would be changed, if hospitals, particularly the larger and more influential institutions, were to employ competent pharmacists who could secure and hold the confidence of the visiting as well as of the resident staff of physicians, and who could and would be consulted on the probable standing of new remedies.

This brings us to a consideration of the intellectual needs and wants of men capable of holding such positions. If the hospital pharmacist of to-day, or the professional pharmacist of to-morrow, is to have and to hold the confidence of medical practitioners, he must be at least the equal of the medical man in education, in ideas and in ideals—so much so that with

the increase in the requirements made of medical students there must be a corresponding increase in the demands that are made on the general information possessed by the future pharmacist. He must be a well educated, thoroughly scientific and altogether capable man, well versed in all the branches of knowledge connected with his own profession, and gifted with a breadth of view that will readily place him above the average of his fellow-men. In return for his knowledge and acquirements he must not expect to be eminently successful from a monetary point of view, but he will be assured of a comfortable existence and the opportunity of doing considerable original work that may in turn revert to the material advantage of himself and his fellow-workers in the same field.

Those of us, however, who have not had the educational advantages that must be provided for the men of the future, and who probably feel that we cannot aspire to fit in exactly with the demands that will be made of the coming professional pharmacist, can, in the meantime, conduct ourselves and our business in such a way that we will gain the trust and confidence of physicians of to-day, and in this way establish a precedent that will be of incalculable value to our more professional and scientifically more able successors of to-morrow.

TEACHING VS. LEARNING.

BY WILBUR L. SCOVILLE, BOSTON, MASS.

In the "Letters from a Self-Made Merchant to his Son," the "old man" writes: "An education is about the only thing lying around loose in this world, and it's about the only thing a fellow can have as much of as he is willing to haul away." There is some sense in this view, and also a considerable misapprehension of what an education really is. The fellow who takes his education from that point of view is apt to do it in much the same way as the youngster who is allowed to select his own food. The result is more likely to be dyspepsia than nutrition, because he picks out what he likes rather than what is most strengthening. For a boy to *e-ducere*, draw himself out, is much like lifting himself by his boot-straps. He is more likely to slop over than to rise.

It is a very popular view of the matter, however, at the present time, because pork packing is so much more "practical" than culture, and it does succeed—for pork-packing. And this "practical" view has crept into the schools and entrenched itself strongly. Schools are selected much like restaurants. The one that offers the greatest variety of dishes at the same price appeals the most strongly. And it tempts the teacher to believe that when he has spread the intellectual food before his class and invited them to partake, his only further duty is to feel their intellectual muscle at stated periods. But doesn't it result in a good deal of mental dyspepsia?

Teaching is more than a selection of mental food and the offering

thereof. By some curious and illogical twist of human nature, really new ideas are seldom welcome. The "man" who in the beginning was ordained to "subdue the earth" and "have dominion over every living thing" likes to feel that he has accomplished this task and that nothing remains to be conquered. It requires an effort to even believe that there are still unsubdued regions. And when a really new idea comes along there is a temptation to resent it as a usurper of complacency. It doesn't find a shelf all cleared and ready for it, but must brush away some cherished or unheeded dust ere it finds a resting-place. Every mental garden has its weeds, which must be pulled out, often reluctantly, before new crops can take root therein. And one of the chief characteristics of a good teacher is an ability and willingness to assist his pupils to make a place for the knowledge which otherwise comes so hard to them, because it finds no place for lodgment. Every new thought must be fitted into the mind, and its relations to other ideas defined before it can be welcomed and developed. No healthy mind contains vacant spaces, but all may contain useless rubbish which may be spared for the trouble of ousting it.

And an important part of the teacher's duty lies in making room for new ideas; in fitting the new into the familiar, and getting a proper perspective. This is not the easy part of teaching. Inspiration costs effort, and the returns are not of the "practical" order. It is easier to spread the mental food before a class and order them to eat thereof. It is important, of course, that the food be wisely selected, and that the class do their part in the eating. And the task of selection and presentation is no mean one for the teacher. But when this is done, it may happen that the pupil can truly, though ungrammatically, say, "he learned me that." Too often is this expression more nearly true to the facts than to the grammar, for the subject was simply called to the attention, and the student absorbed as much as he could of it, with little help in the absorption process.

Every life has a dominating idea, and new ideas appeal according as they support and develop it. One student has the "practical" idea, which in these days means an appreciation of finances. His interest in botany, chemistry and physics depends upon the extent to which he can see that "there's money in it." And he may be made to interest himself in them from that standpoint to his own good, and that of the people as well. But is he well taught unless some effort is made to show him that culture has a value of its own not expressed in dollars and cents, and that an education may be valued for its power of making friends, and the increased capacity for enjoyment which it brings into life? And won't he accomplish more in the future if he gets this idea mixed with the other? Another student has the intellectual idea, and values knowledge for its own sake. He doesn't need to force an interest in the sciences, for

he finds real enjoyment in study, and he dreams of the time when he too may contribute to human knowledge. But isn't it well for him to be taught that knowledge of itself is one of the cheapest things in the world? and that it finds its highest value in its usefulness to people who may appreciate not it but its results? And he may be taught that a knowledge of people and their needs is necessary in order that his studies may contribute to their happiness and his own usefulness. Then he is more likely to graduate with a proper appreciation of the necessity of fitting his knowledge into others' wants, and with less of the feeling that his degree is going to be a veritable magnet for dollars.

One-idea men are plentiful, but generous-minded men are mostly the product of good teachers. This is a strenuous ideal for the teacher, and he should not be blamed if he fails to attain to it at once. He may have very discouraging materials out of which to fashion ideal conditions.

But to apply our idea: there are two subjects in our colleges of pharmacy in which the verb "to learn" may be applied more in the objective than the subjective form.

First the teaching of identification. There is no more striking illustration of the passing of the apprenticeship system than the fact that what the apprentice formerly learned by familiarity in handling, the schools are now called upon to teach. Identification, by which I mean the recognition of drugs and preparations at sight, is commonly regarded as a matter to be learned, but hardly as a matter to be taught. Yet teaching may have a small place even here. The placing of good and typical specimens before the student gives him a good opportunity to learn, but suggestions where to place them in his memory are in the line of teaching them.

A large number of specimens put before him is confusing. He may not realize at once that identification is the bric-a-brac of knowledge, and only needs to be arranged on his memory-shelves. If his attention can be called to familiar facts which can be associated with the characteristics of the articles, he finds a ready method of storing up these characteristics of the articles in his memory. Points of resemblance in color, in odor, in taste or other physical qualities which would come to the student but slowly, may be placed before him at once.

In the Massachusetts College of Pharmacy the pharmaceutical preparations were numbered but not otherwise labelled, and placed on shelves where they were always accessible. Then each student was furnished with a key, giving not only the names corresponding to the numbers, but also suggestions for learning them. At the beginning some general suggestions were made, as follows:

1. Provide yourself with a few small strips of white paper for use in tasting and noting the color of the fluids in thin layers.
2. Try to identify without the aid of the key.
3. Note first the appearance of the article in the bottle, *i. e.*, color, consistency, weight, etc.

4. If a liquid, shake the bottle gently and note the mobility, color of the liquid on the sides of the bottle, appearance on the lip (syrups, resinous preparations, oily, etc.) the degree of frothing, etc.

5. Note the odor. Take first a quick, light whiff from the stopper of the bottle, then if necessary, a slow and deeper inhalation from the bottle itself.

6. Let a drop or two fall into water and note the character of the precipitate formed, if any.

7. If still in doubt put a few drops on paper, note the color, penetration of the paper, fluidity, etc., taste cautiously.

8. Do not attempt to identify but a few samples at a time.

Then after each preparation on the key are given such separate suggestions as could be collated, calling attention, for instance, to the resemblance between anise and fennel preparations, between ergot and taraxacum preparations, and between arnica and calendula preparations in odor: to the resemblance of Hoffman's anodyne to a kerosene odor, of benzoin and tolu preparations to vanilla, asafoetida to onions, guaiac to maple syrup, nux vomica to molasses, senna to figs or raisins, ergot to a fishy odor, Huxham's tincture to mildewed linen, etc.

Peculiarities in the color of preparations of chlorine (fade on standing), iodine (brown meniscus for the tincture and red for compound solution), of iron (green for ferrous, and yellow, garnet, red or green for ferric), rhubarb and hydrastis (yellow meniscus), guaiac and ergot (blue or purple meniscus), sanguinaria and wild cherry (red), liquorice (yellow), cold cream (character of oil used), etc.

To the fact that alcoholic preparations of leaves are green, of barks red to brown, of roots yellow to reddish-brown, etc., as a rule, while aqueous preparations of the same are usually darker. To variations in color as found in commercial preparations of spirit of wintergreen, syrups of tar and wild cherry, of tinctures of myrrh, benzoin and camphorated opium, of Basham's Mixture, Fowler's Solution, Griffith's Mixture, elixirs, resin of podophyllum, etc. To the ready frothing of preparations of digitalis, sarsaparilla, senega and quillaja. And to the sticky feeling of resinous tinctures, as aloes, myrrh, benzoin, etc., or the slippery feeling of glycerites, soap preparations, etc.

To the fact that the taste of preparations may vary with age (ammonium acetate solution, neutral mixture and other effervescent preparations), or with the strength of the preparation tasted (as tolu, guaiac, coca), or that the taste changes markedly in the mouth, as in syrups of ipecac, senega, squill-compound and lime, or tinctures of aloes, quillaja, guaiac and tolu, solution of lead subacetate, etc.

These are some of the points which can be set before a class, and would constitute what I beg to be allowed to term the difference between *teaching* a class to identify and *learning* a class to identify.

The metric system is taught in colleges of pharmacy. That is, it is taught as to its origin, constitution, and its relation to other systems of weights and measures. Its scientific convenience is also taught, and its scientific or professional use. But from the observation of text-books and literature I am unable to find that its commercial use is taught to any extent.

The Pharmacopœia directs its preparations to be made by the kilo or liter. The pharmacist buys the ingredients by the pound, and sells the preparations by the ounce. Can he buy these preparations to advantage already prepared, or is it cheaper for him to make them? How shall he know? Traveling salesmen come into his store and tell him that he can buy the preparations cheaper than he can make them. He is prone to believe it because he has not been taught to question it, and if he feels inclined to do so, he finds himself confronted with a formidable array of figures that seem far too appalling for the sum involved. He must change so many grams into grains, then figure the cost of this number of grains at so much a pound; do this for each of several ingredients, add the totals, then again change the total grams into grains, and figure the cost of his preparation per pound.

If he is busy he won't take the necessary time to do this, and if he has the time the task doesn't seem worth while.

Now this changing of grams into grains, of cubic centimeters into fluid-ounces, is not at all necessary. What the pharmacist wants to know is how many pounds or pints or fractions of these he is dealing with, and this is a matter easily and accurately figured. He can forget for this how many grains there are in a gram, and how many minims there are in a cubic centimeter. He needs only to know that a kilo is 2.2 avoirdupois pounds, and a liter is 2.11 wine pints. Therefore a gram is 0.0022 lb., and a cubic centimeter is 0.00211 pints.

The method of employing these figures is best shown by an example.

FORMULA.

Iron wire	25 Gm. @ 20c. per lb.
Iodine	83 Gm. @ \$3.65 per lb.
Syrup	700 Gm. @ 32c. per gallon.

To make 1000 Gm. of Syr. Ferrous Iodide:

25 Gm. $\times .0022 = .035$ lb. @ 20 c. = 0.7 c. for iron.

83 Gm. $\times .0022 = .1826$ lb. @ \$3.65 = 66.649 c. for iodine.

700 Gm. Syr. + 1.31 sp. gr. = 534 Cc.

534 Cc. $\times .00211 = 1.12674$ pints @ 8c. = 9.014 c. for syrup.

1000 Gm. or 2.2 lbs. cost 76.363 c.

1 lb. cost 76.363 $\div 2.2 = 34.71$ c.

The senior class has been required to figure the actual cost of a number of preparations made in the laboratory *by this method*, with an apparent double benefit to the student.

THE SIGNIFICANCE TO PHARMACEUTICAL EDUCATION IN THE UNITED STATES OF THE CONSOLIDATION OF THE NEW YORK COLLEGE OF PHARMACY WITH COLUMBIA UNIVERSITY.

BY H. H. RUSBY.

On July 1 of the present year the College of Pharmacy of the City of New York became the Department of Pharmacy of Columbia University, the former receiving no financial support from the latter, and retaining all rights and privileges in the expenditure of its income. Its board of trustees continues to control the curriculum and the faculty, except in so far as regards unity of system and regulations. The faculty of each institution is represented in that of the other, and provisions for mutual interchange of instruction and use of libraries, collections, apparatus and laboratories are established. Details of the arrangement are omitted as not being pertinent to the present discussion.

It is scarcely necessary to observe that such a step on the part of one of the largest and oldest of our schools of pharmacy is of considerable general interest. It is the object of the present paper to discuss its bearings on pharmaceutical education in this country, taking, as far as possible, the unprejudiced view of an outsider, while bringing to bear the information of one upon the inside. Every important move upon this board should be made in the interest of improvement in general conditions, and it is this feature of the case to which your attention is invited.

All the educational conditions in American pharmacy which seriously call for improvement have been repeatedly brought to your attention by members of this Section. We probably include them all when we say that large numbers of licensed pharmacists are turned out who have insufficient knowledge and training, are wanting in professional spirit, and entertain loose ideas of right and wrong in relation to their professional work. The root of the evil lies in two conditions so intimately associated that neither can be regarded as fundamental to the other, and which act and react in the form of the pernicious circle. These are (1) want of preparation for professional study, (2) acceptance of the incompetent by boards of pharmacy. These two conditions, in turn, have been maintained by lack of uniformity in the pharmacy laws of different States, and in procedure by the pharmacy schools, even within individual States. As influencing these conditions the practice of the lowest elements has been far more effective in retarding the evolution of the higher than that of the higher has been in elevating the lower. Among those which have maintained the lowest entrance requirements are some of the largest schools of the East, and their momentum has been too great for the more advanced to overcome. It is in the highest degree creditable that some of the smaller university schools of the West should have maintained so unequal a competition with the persistent courage that they have

displayed. In the bringing about of the uniform development to which all of our schools must ultimately attain, they will be entitled to a high degree of credit for the manner in which they have discharged this public trust.

The converse proposition does not follow. It is not necessarily true that the schools which have not taken the higher stand are reprehensible, nor that they are not also entitled to credit for having made the best of adverse conditions. A half loaf is better than no loaf at all. Soldiers fight under very different conditions in different parts of the field. When the garrison is sick, it is enough to barely hold the fort until health returns and aggressiveness can be resumed.

The schools of the East have had educational scavengers to contend against, institutions devoid alike of honesty and honor. Unscrupulous, untruthful, anarchistic, restrained by no considerations of shame, and at times subjected to legal restraint where lenient laws take up only the grosser violations. The creatures of these institutions have come before the boards on an equal footing with the best, and have found it easy to satisfy farcical requirements. When the boards have shown the slightest disposition to perform their public duty in the spirit as in the letter, the institutions to which such a course was fatal have organized the dregs of pharmaceutical society in political efforts to prostitute. Under such circumstances one question has everywhere confronted those who have urged prospective pharmacists to properly qualify themselves, "What is the use of my spending time and money in getting an education, when I can enter the ranks without it?" A hundred satisfactory answers suggest themselves to you and me, but to inexperienced, eager and impetuous American youth they are not satisfactory.

And so it has been that the schools which would, if they could, could not. They have been effectually handicapped for the time, and have been obliged to content themselves with waiting.

The key to this situation is a change in board practice. Such a change no board could make and maintain without the protection of legal provisions. Toward such provisions public sentiment has been for a long time slowly shaping itself, but the pharmaceutical element alone, and this element divided against itself, was not strong enough to accomplish much. An alliance with educational interests in other directions was essential to complete and permanent success. Especially was this true of medical interests. Infuriated by the disclosure of gross irregularities on the part of the scum of pharmacy, the physicians of the East, and particularly those of New York and vicinity, indulged in indiscriminate condemnation of pharmacy. This tendency ran so far that educational provisions were introduced to the medical schools for rendering their graduates independent of pharmaceutical services. Through the physicians and the

press the public were excited to violent condemnation of pharmacies and pharmacists. The excitement reached the legislative body, and various indiscriminating bills for restraining and coercing pharmacists were introduced.

It was of the first importance that this situation should be relieved, and that these hostile interests should be rendered friendly before any really helpful legislation could be reasonably looked for. An important step toward the accomplishment of this object, so far as the State of New York is concerned, was taken when one of its leading pharmacy schools consolidated with one of the leading universities, and that one which maintains the largest, strongest and most influential medical school in the State. An immediate result was to put an end to the process of alienation between the medical and pharmaceutical interests there represented. Two members of the medical faculty became *ex officio* members of the pharmaceutical faculty, and the dean of the latter became a member of the university council. The president of the university became the president of the pharmacy school. Every opening is thus provided for a perfect understanding, and for such a degree of confidence as is justified by the facts. The State Department of Education and the Board of Regents now become interested in the pharmaceutical institutions, as they have not been able previously to do, and these two bodies, so powerful in their legislative influence, can be now relied upon to aid in the best development of the educational interests of pharmacy in New York City.

Just at this juncture, though quite independently of the consolidation under discussion, a most important State law was enacted. Henceforth no license will be granted to a candidate who has not graduated from a pharmacy school maintaining a course of at least two years, and requiring as an entrance preliminary, an educational qualification equivalent to twelve Regents' counts. The school must, moreover, be of a character satisfactory to the State board. In deciding upon a satisfactory standard, by which such fitness of the pharmacy schools shall be determined, a complete and thorough analysis of all the pharmacy schools in the country is made by the Board of Pharmacy and the Board of Regents in association.

It may be asked what relation there is between this legislation and the subject of this discussion. Its significance is this. The legislation in question is experimental. Its execution will be fought by the truculent elements, to which our respects have already been paid. Every effort will be made to nullify the law and to introduce a confusion calculated to render it unsatisfactory. On the other hand, this legislation is to be regarded as only a step in the upward direction, to be followed, slowly and cautiously, so as to do violence to no worthy interest by other similar

steps. This situation means a conflict in which it is important that every influence tending in the right direction should be enlisted. In this contest the New York college will stand shoulder to shoulder besides its sister institutions. Its effectiveness will be incalculably increased through its new association, by which all the associated interests will profit equally in the struggle. There can be no reasonable doubt as to the outcome. Public support will henceforth be discriminately enlisted in the interest of better pharmaceutical education in our State.

Is it necessary to say to our friends in Michigan, Wisconsin, Minnesota and California that this operation in New York will favorably affect their interests? Not at all. They are already jubilating at the prospect of having a heavy burden lifted. Unquestionably they have received a powerful reinforcement.

In New York City and vicinity there are nearly 3,000 pharmacies which will come under the influence of the new law, and throughout the State there are probably nearly as many more. The closing of these pharmacies against the graduates of schools which do not attain to the standards now set, and those hereafter to be instituted, will constitute the strongest kind of a stimulus to schools elsewhere. Furthermore, such an illustrious example, in one of the most important States, of an action that at once commends itself to all right-thinking persons cannot fail to be imitated, until the entire system of pharmaceutical education in this country shall be in vigorous movement toward a higher plane. Whatever assistance the movement in New York State has received, or shall hereafter receive, as a result of the consolidation of the New York College of Pharmacy with Columbia University constitutes the significance of that consolidation to pharmaceutical education in this country.

THE STUDY OF PHYTOCHEMISTRY.

BY EDWARD KREMER.

Liebig has been regarded as the founder of scientific organic chemistry. In as much as early organic chemistry was largely the chemistry of plant substances, and since modern phytochemistry is intimately associated with and so largely dependent on organic chemistry, one does not feel surprised upon finding a chemical historian who practically dates the modern development of phytochemistry from the productive period of Liebig and his students.*

Though Liebig revolutionized organic chemistry and thereby laid the foundation for a new phytochemistry, organic and plant substances were

* E. v. Meyer, *Geschichte der Chemie*: "Die in grosser Mannigfaltigkeit von den Pflanzen erzeugten Stoffe sind namentlich seit Liebig's anregendem Wirken Gegenstand eifriger Forschung gewesen; parallel der Zoöchemie hat sich insbesondere seit Ende der vierziger Jahre die Phytochemie entwickelt."

studied scientifically by chemists before his time. While it is true, as Kopp* points out, that up to the close of the phlogistic period organic substances were rarely studied for their own sake, but rather as pharmaceutical agents, or as dye stuffs or for other technical reasons, it is equally true that toward the close of this period Scheele's and Bergmann's investigations paved the way for this new science.† Indeed, of such importance is the work of Scheele along this line that he has been pronounced the founder of modern phytochemistry.‡ It is claimed that he was the first to point out that plant substances can be and should be isolated as chemical individuals, and that this step marks such a degree of progress that he is entitled to the distinction of being regarded as the founder of modern phytochemistry.

According to the classification of all natural objects into the three kingdoms, the mineral, vegetable and animal, chemists towards the close of the seventeenth century began to classify chemical substances in like manner.§ The expression "chemical substance," however, is not, in this case, synonymous with chemical individual, for Lemery includes chemical mixtures and even parts of plants in that part of his chemical treatise devoted to the vegetable kingdom.||

About 1780 Bergmann began to distinguish organic from inorganic substances. However, it was only after it could be shown that many organic individuals were found in both the animal and vegetable kingdom, that the older classification was gradually dropped and the newer one adopted.

In like manner, after Wöhler had effected the synthesis of urea in 1828, the distinction between organic and inorganic was not immediately dropped. Only after many other carbon compounds had been prepared from their elements, the idea of a vital force as a necessary element (?) in the preparation of carbon compounds was discarded, to be revived, however, in modified form as a neovitalistic theory at the close of the nineteenth century.¶

While we should regard chemistry as a unit, it will, no doubt, always be divided and subdivided in various ways. Thus for convenience we speak of pure chemistry and applied chemistry; of general chemistry and of

* Geschichte der Chemie, Bd. iv, p. 236.

† Ibidem.

‡ Rosenthaler, Die Pflanzenchemie von Du Clos bis Scheele. Berichte d. d. ph. Ges., 14, p. 296.

§ E. g., Lemery, Cours de Chimie.

|| Cours de Chimie, pp. 599 to 802 of the edition of 1756. The second part of this book is devoted to "vegetables" or vegetable substances. In addition to a few substances now regarded as chemical individuals, such as camphor and tartar, it includes such mixtures as turpentine and aloes, also organized drugs such as jalop, cinchona bark, etc.

¶ ———

special chemistry such as analytical, physical, thermal, electrochemistry, etc. For the sake of convenience we will speak of inorganic and organic chemistry as another mode of dividing the field. In like manner we speak of a biochemistry, and, so long as there will be a science of botany and a science of zoölogy, we may be expected to divide the chemical field along these lines into phytochemistry and zoöchemistry.

All of these methods of classification will prove useful if we but bear in mind the reasons for their existence and do not allow effects dictated by causes of convenience unduly to control our thoughts and actions. In other words, we should not, though it be but involuntarily, draw lines of distinction where these become detrimental to true progress. Again, we have no right to adhere to antiquated notions under the name of phytochemistry, if the study of chemistry at large has shown these conceptions no longer to be correct and not in harmony with true progress.

With these admonitions in mind, the study of the chemistry of plants is as legitimate a limitation of human activity as ever in chemical science. With the enormous development of this science, it has become even more imperative than before ; indeed, a further subdivision of the phytochemical field has become necessary for successful research.

If what has been said is true, it becomes apparent that the subject-matter, with which phytochemistry deals, should be treated in accordance with the most advanced ideas of the science of chemistry at large ; that, *e. g.*, it should be classified in harmony with the best method of classification of chemistry and botany.

Viewed from a chemical point of view, a knowledge of the genetic relation of plant substances and of their occurrences in the vegetable kingdom may enable us to throw much new light on the study of the living plant and ultimately on the process of life itself. Regarded from a botanical point of view, a growing knowledge of the constituents of plants will gradually teach us what substances are of general occurrence, which are characteristic of large subdivisions and which of smaller ones. Botanical classification, still largely based on morphological characteristics, will ultimately be changed, if necessary, in accordance with a better knowledge of the chemical constituents of plants.

These are some of the larger aims of plant chemistry. Incidentally the development of this branch of our science will assist the pharmacist in a better understanding of vegetable drugs and their preparations, the agriculturist will acquire a better knowledge of his crops, the technologist will have new fields of conquest opened before his eyes.

It is not with plant chemistry in its various applications, that I intend to deal primarily, but with phytochemistry pure and simple as it were, without ignoring the fact, however, that pharmaceutical and agricultural chemistry are in turn contributing largely to the domain of plant chemistry to-day as they have done a hundred years or more.

In order to understand our present position it is necessary to study the past. In the study of phytochemistry this is all the more important since there linger with us so many conceptions that were once well founded in the limited knowledge of the past. In other words, while, *e. g.*, organic chemistry has outgrown many of its theories of the middle of the nineteenth century, phytochemistry still adheres to them in a manner that is decidedly detrimental to its best development.

The history of plant chemistry can be classified into periods in several ways, according to the point of view taken of the subject. The following classification is suggested as a tentative one. The reasons for adopting the periods as given are stated briefly in connection with each period.

I. From the beginning of chemical study up to the close of the seventeenth century, the time when the chemical subject-matter was classified in accordance with the three natural kingdoms into mineral, vegetable and animal. This period comprises the first three periods of chemical history.

It is but natural that the study of plants and plant products should rest under the ban of the prevailing modes of thought and chemical theories of these periods. The first chemical period is characterized by an empirical study of natural objects and by a tendency to speculation often irrespective of observed facts. The complex phenomena of plant chemistry naturally could contribute but little to science in a period when even simple inorganic experiments failed of successful interpretation.

During the alchemistic period of chemical history, when attention was concentrated upon the attempt to convert the baser metals into nobler ones, no material progress in plant chemistry need be expected. Neither could the iatrochemical school, which opposed galenical medicine and pharmacy, contribute much to the chemical study of plants.

However, chemists did not totally ignore the study of plants and plant products during these periods, although the prevailing theories drew their support principally from the study of the metals and their salts. Thus, *e. g.*, among the earliest chemical products known we find such as we now relegate to the domain of organic chemistry. The only acid known to the ancients was an organic acid, *viz.*, acetic acid. An organic plant substance, a preparation of nutgalls containing tannin, was the first reagent employed. Another organic plant product, turpentine oil, appears to have been the first substance obtained by the process of distillation, a process possibly of greater importance than any other in the entire history of chemistry. The first salts were prepared with an organic acid, and the process of saponification was practiced at an early date. Fermentation of wine and vinegar were known. Fats, oils, resins, gums, starch, sugar, vinegar, pigments were obtained from vegetable sources.

While during the alchemistic period the process of distillation was practiced principally with the aim of producing the philosopher's stone, it also

led to the preparation of aromatic waters and the discovery of a few volatile oils. The destructive distillation of tartar was also attempted, thus not only leading to the discovery of potassium carbonate, but also preparing the way for a principal phytochemical method of technique of the next period. Benzoic acid from benzoin, succinic acid from amber, wood vinegar from wood, are some of the contributions to our knowledge of plant chemistry by the method of destructive distillation.

Although iatrochemical theories were at least in part based on observations made in connection with animals and plants, the former as represented by the human body demanded the special attention of the medico-chemists. While it is true that pharmaceutical chemistry made commendable progress during the iatrochemical period, it should not be forgotten that the medico-chemists of this period advocated inorganic remedies in opposition to the older galenical preparations. Thus the chemical study of vegetable drugs and galenical preparations, which later contributed so much to the development of plant chemistry, received a setback by the attitude of the followers of Paracelsus.

II. The period during which the chemical subject-matter was classified according to the three natural kingdoms into mineral, vegetable and animal. For the sake of convenience rather than of absolute accuracy, we may date this period from about 1675, the date of appearance of Lemery's *Cours de Chimie*, to about 1780, the time when Bergmann suggested the more rational classification into inorganic and organic. This period is approximately contemporaneous with the phlogistic period of chemical history at large.

That the iatrochemical theories drew attention to the mineral and animal kingdoms, and retarded the chemical study of plants, has already been pointed out. Neither could the phlogistic theory of combustion and calcination contribute much to the study of plants. The burning of plants or plant products may reveal their inorganic components, at least in part; but this process destroys absolutely their more complex organic constituents.

We are not surprised, therefore, that this second period of plant chemistry has but little genuine progress to record. We are prepared to learn that the method which leads to the discovery of benzoic and succinic acids, when indiscriminately applied as it was during this period, yielded scarcely any satisfactory results. The pyrochemical investigations of 1400 plants and plant products have been buried in the *Memoires of the French Academy*. May they forever rest in peace.

III. The third period begins contemporaneously with the antiphlogistic or quantitative period of general chemical history. It is modern chemistry that we now have to deal with. Organic and with it phytochemistry leans strongly on inorganic chemistry, in connection with which the study of oxygen, its acids and bases, and their salts are studied. The development

of organic analysis is essential to an empirical understanding of the chemical individuals isolated from plants and plant products. These new substances are viewed in the light of prevailing inorganic theories as far as this is possible. The acids, tartaric and succinic, attract special attention. Their salts of the metals are known, but not until the discovery of the basic properties of morphine, this "new salifyable plant base," by Sertürner in 1817 are any organic bases known to chemists. While theoretical chemists heralded this discovery as the proof that organic compounds could be classified, like their inorganic prototypes, into acids, bases and salts, the pharmaceutical chemist, recognizing the therapeutic relation between morphine and opium, at once began a search for other physiologically active substances of a basic nature in well-known toxic drugs. How successful this search has been, becomes apparent from a mere glance at a list of alkaloids arranged according to the date of their discovery. While such analogies as those between the organic plant acids and inorganic acids, between the alkaloids and metallic bases, were utilized theoretically for all they were worth by the chemical philosopher, plant chemistry had to deal with numerous other substances that revealed no such analogies. Many of these substances were not chemical individuals, but mixtures. Among the chemical individuals isolated from plants we have cane-sugar, camphor, later menthol and others. Among the mixtures we find fatty and volatile oils, gums, resins, etc., the chemical complexity of which, in most instances, is not even surmised. The classification of the volatile oils, *e. g.*, into hydrocarbon oils, oxygenated oils and oils containing nitrogen and sulphur in addition to carbon, hydrogen and oxygen is characteristic of this conception. When we find that a volatile oil, of which we now know ten to twenty different constituents is subjected to elementary analysis as such as late as the thirties, we cannot but feel that the great importance of studying chemical individuals rather than plant mixtures is not as fully appreciated as it might be.

Nevertheless the characteristic of this period as compared with former periods is the study of chemical individuals isolated from plants or plant products. As opposed to the ultimate principles: water, carbon, acetic acid, wood spirit yielded more or less by all plant products when subjected to the analysis by fire (destructive distillation) these new substances were termed proximate principles, that is, those principles of plants "which enter immediately into their composition, when these principles have not been altered by further decompositions, and consequently when they still present their . . . vegetable character." *

IV. Period.—It has already been stated that the claim is made for Liebig of being the founder of scientific or modern organic chemistry. This branch was made independent of inorganic chemistry and followed

* Macquer, Dict. of Chemistry, Engl. ed. 1771, p. 363.

its own ways and in the course of time became the stronger sister to which inorganic chemistry looked for new ideas and new inspirations. In 1843 Liebig re-edited the chemical part of the fifth edition of Geiger's "Handbuch der Pharmacie" as the "Handbuch der Chemie." The second part, devoted to organic chemistry, placed organic chemical book literature on a new basis. It served as a guide to chemists the world over. In as much as Liebig and his students had devoted much of their time to the study of substances derived from plants, it does not surprise us to find the large amount of space devoted to what we are pleased to designate plant chemistry.

The newer theory of radicles which had its birth in the classical researches of Liebig and Wöhler of the bitter almond oil obtained by the hydrolysis of amygdalin, two plant products, was the prevailing theory. Plant products of known constitution were classified with others of their kind in the general system of classification of carbon compounds. However, the lumber chamber of compounds, whose relationship has not been ascertained, is still great and the older classification still prevails to a large extent not only at the beginning of this period, but even to-day.

The theory of types which did such admirable service during the middle of the last century has not released its grip on plant chemistry, even though for purposes of classification it has been superseded by more rational principles of classification. Not only were aniline and like bases viewed successfully as substituted ammonias by Hofmann in the early forties, but the alkaloids as well, and to-day text-books still define them as such.

The structural theories of Kekulé as manifested in the later conceptions of the pyridine molecule in which a methenyl group of benzene has been displaced by an imido group, were reëchoed in the chemistry of the alkaloids, and to-day we find one of the latest treatises arranged on König's definition that an alkaloid is a pyridine derivative, although the author admits that recent structural investigations in this field have revealed that but few of these bases can be referred back even to reduced pyridine and quinoline nuclei. Thus we find one organic theory after another reëchoed in the study of organic plant substances.

Whereas, during the previous period organic facts were interpreted in the light of inorganic theories, inorganic chemistry now began to interpret its facts in the light of organic theories. In like manner, phytochemistry, always a modest contributor to the science of chemistry, while continuing to receive aid from organic chemistry, became an important contributor as well.

Thus, *e. g.*, the study of the property of the deviation of polarized light has been developed largely with the aid of plant products and their derivatives. As a matter of fact, this branch of physical chemistry is to-day largely dependent upon the materials obtained from the plant-world for

its study. With these observations, there has been developed the hypothesis of optical isomerism, one of the most interesting and fruitful chapters in the study of isomerism, the physiological importance of which is just beginning to dawn upon us.

In this connection, the vitalistic theories should be remembered. With the synthesis of urea by Wöhler, in 1828, the first serious blow was struck at the old vitalistic theory. The hold which this theory had upon man's imagination can best be comprehended if we stop to consider that it has sprung up anew. The new vitalistic theory of to-day is largely dependent upon the study of optical isomerism of plant products for its support.

The very terms aliphatic and aromatic of organic classification at once suggest properties of plant products. The chasm that long existed between the fatty series of compounds on the one hand and the benzene series on the other has largely been filled in by the study of the so-called terpenes and camphors, again by plant products.

Other instances might be mentioned showing the indebtedness of organic chemistry and of chemical theories at large to plant chemistry. The few mentioned, however, may suffice. Yet with all this progress, phytochemistry still has an enormous lumber chamber the dabbling in which is apt to cast a ray of scientific inferiority upon the science of phytochemistry as a whole. While on the one hand substance after substance is being removed to receive its position in the well regulated drawing-room of structural chemistry, if you will pardon this figure of speech for the sake of avoiding mixed metaphors, large numbers of new plant substances of unknown constitution are at least temporarily and mostly for long periods of time added to this lumber each year.

In this brief introduction to phytochemistry, the attempt has been made to show the relation between phytochemistry and chemistry at large, to demonstrate as far as possible the interaction between phytochemistry as a branch of the general science and other branches of the science of chemistry. To attempt to characterize a period by a method of procedure of plant investigation, as has been done recently, seemed to the writer a failure to grasp the real significance of the subject. It is but natural that phytochemistry, like mineralogical chemistry and technical chemistry, should have its devotees who were not masters of the general science of chemistry of their period. Their dabbling in the science, though their reports be voluminous and fill pages of the transactions of learned societies, cannot well be taken as the true index of the period in which they lived. It would be as wrong to characterize the past period of plant chemistry by stating that the energies of its disciples were devoted to the investigation of plants by selective solvents, or to state that tens of thousands of useless nitrogen determinations must be regarded as the keynote of agricultural chemistry of the past quarter of a century, as it is to

attempt to characterize an earlier period of phytochemistry by the method of pyro-analysis because some of the representatives of that period, even though they be members of the French Academy, insisted on this unscientific procedure.

So long as vegetable substances constituted a large part or even the bulk of what we now call organic chemistry, there appears to have existed no separate phytochemical book literature, unless we regard the "Destillirbücher" and similar special treatises as such.

Phytochemistry became a distinct branch of chemistry only after organic synthesis had produced its thousands of new compounds which awakened a new interest in organic chemistry that was in no way connected with life, be it vegetable or animal. In Liebig's "Handbuch der Chemie" of 1843 more than half of the space devoted to organic chemistry is given over to the "Anhang," in which plant substances, most of them mixtures, are dealt with.

Rochleder, who is favorably known for his investigations of the tannins and glucosides, appears to be the first to have written an independent phytochemical treatise. It was followed by that of Wittstein and later by the monumental work of the Husemanns (1869-1871). Death took away the older of the Husemanns (cousins) before the second edition made its appearance. Theodore Husemann was a feeble old man when the writer had the pleasure of meeting him in Göttingen in 1890. The book has not been revised since its second edition in 1887, with A. Hilger as co-author, although a third edition was promised about ten years ago.* Since then no similar attempts to cover the entire field have been made.

BEITRÄGE ZUR PHYTOCHEMIE. Von Friedrich Rochleder. Wien, 1847. Aus der k. k. Hof- und Staats-Druckerei.

Inhalt.

Ueber die Zusammensetzung der organischen Bestandtheile der Pflanzen im Allgemeinen (pp. 7-11).

Ueber die Zusammensetzung der Pflanzenstoffe im Besonderen (pp. 11-22).

- I. Familie. Kohlehydrate.
- II. Familie. Fettsäuren.
- III. Familie. Gerbstoffe.
- IV. Familie. Lichenyle.
- V. Familie. Tetryle.
- VI. Familie. Decatryle.
- VII. Familie. Camphene.
- VIII. Familie. Bioxyde.
- IX. Familie. Aether.
- X. Familie. Acrodyle.
- XI. Familie. Albuminoide.
- XII. Familie. Alcaloide.
- XIII. Familie. Gepaarte Verbindungen.

* Galerie hervorragender Therapeutiker und Pharmacognosten, p. 64.

Ueber die Metamorphosen, welche die Stoffe in den Pflanzen während des Lebens derselben erleiden (pp. 23-45).

Einjährige und perennirende Gewächse (p. 46).

Ueber die Vertheilung der Pflanzenstoffe in den Pflanzen (pp. 47-49).

Schluss (pp. 49-51).

PHYTOCHEMIE Von Friedrich Rochleder. Leipzig. Verlag von Wilhelm Engelmann. 1854.

Inhalt.

Einleitung.

Erster Abschnitt. Analysen der Pflanzen, mit besonderer Rücksicht auf ihre organischen Bestandtheile (pp. 1-250).

Zweiter Abschnitt. Analysen der Pflanzen, mit alleiniger Berücksichtigung ihrer unorganischen Bestandtheile (pp. 251-255).

Dritter Abschnitt. Ueber den Zusammenhang zwischen der Form und Zusammensetzung der Gewächse (pp. 257-308).

Vierter Abschnitt. Der Stoffwechsel in den Pflanzen (pp. 309-344).

I. Nahrungsmittel der Pflanzen.

II. Bestandtheile der Pflanzen.

III. Metamorphosen in den Pflanzen.

IV. Bewegung der Stoffe und ihre Folgen.

V. Einfachheit der Zusammensetzung der Pflanzen.

VI. Das Verhältniss der organischen zu den unorganischen Bestandtheilen der Vegetabilien.

VII. Perioden im Stoffwechsel.

VIII. Pflanzengeographie.

Anhang (pp. 345-370).

Alphabetisches Verzeichniss der bis jetzt, ihrer Zusammensetzung nach, bekannten Bestandtheile der Pflanzen.

Index familiarum.

Index generum.

CHEMIE UND PHYSIOLOGIE DER PFLANZEN. Bearbeitet von Dr. Rochleder, Professor in Prag. Heidelberg Universitätsbuchhandlung von Karl Winter, 1858.

Inhalt.

Phytochemie.

Einleitung (pp. 1-7).

A. Chemische Botanik. (pp. 7-98.)

Analysen vegetabilischer Körper.

I. Vegetabilia dicotyledonea.

II. Vegetabilia monocotyledonea.

III. Vegetabilia vascularia cryptogama.

VI. Vegetabilia Cellularia.

B. Chemische Physiologie der Pflanzen. (pp. 99-152.)

§ 1. Endprodukte des Stoffwechsels.

§ 2. Nahrungsmittel der Pflanzen.

§ 3. Aufnahme der Nahrungsmittel und Vertheilung der Stoffe in den Pflanzen.

§ 4. Ueber den aufsteigenden und absteigenden Saftstrom.

§ 5. Eigenwärme der Gewächse und Bedeutung der Wärme und des Lichts für die Pflanzen.

§ 6. Licht.

§ 7. Electricität.

§ 8. Keimen der Samen.

Anhang. Ueber das Reifen der Früchte. (pp. 153-154.)

DIE PFLANZENSTOFFE in chemischer, physiologischer, pharmakologischer Hinsicht. Für Aertze, Apotheker, Chemiker and Pharmakologen bearbeitet von Dr. Aug. Husemann, Dr. A. Hilger and Dr. Theod. Husemann. Zweite völlig umgearbeitete Auflage. In Zwei Bänden. Berlin. Verlag von Julius Springer. 1882.

I. ALLGEMEINER THEIL.

A. Chemische Vorgänge im pflanzlichen Organismus. Entstehung organischer Substanz (pp. 3-11).

B. Chemische Charakteristik der Pflanzenstoffe (pp. 12-72).

Kohlenhydrate.

Glycoside.

Bitterstoffe und Farbstoffe.

Gerbsäuren (Gerbstoffe).

Pectinstoffe.

Pflanzensäuren.

Die Pflanzenbasen oder Alkaloide.

Fette (Wachsarten).

Aetherische Oele.

Camphor.

Harze (Balsame).

Proteinstoffe.

C. Wirkung und Anwendung der Pflanzenstoffe (pp. 73-100).

II. SPECIELLER THEIL.

A. Allgemein verbreitete Stoffe.

1. Unorganische Bestandtheile der Pflanze (pp. 103-105).

2. Kohlenhydrate (pp. 106-188).

3. Organische Säuren allgem. Verbreitung (pp. 188-261).

4. Eiweissstoffe (Proteinkörper) (pp. 231-236).

5. Ungeformte Fermente (pp. 237-240).

6. Pflanzenfarbstoffe (pp. 241-261).

7. Amidverbindungen (pp. 263-272).

B. Pflanzenstoffe beschränkter Verbreitung* (pp. 273-1543).

PHYSIOLOGISCHE CHEMIE DER PFLANZEN. Zugleich Lehrbuch der organischen Chemie und Agrikulturchemie für Forst- und Landwirthe, Agrikulturchemiker, Botaniker, etc. Von Dr. Ernst Ebermayer. Erster Band. Die Bestandtheile der Pflanzen. Berlin. Verlag von Julius Springer. 1882.

Inhaltsübersicht.

Die Bestandtheile der Pflanzen.

Erster Abschnitt. Wassergehalt der Pflanzen. (Vorkommen, Vertheilung, etc., quantitative Bestimmung (pp. 2-29).

Zweiter Abschnitt. Die organischen oder verbrennlichen Bestandtheile der Pflanzen (pp. 30-708).

Allgemeine Betrachtungen.

A. Die stickstofffreien Erzeugnisse der Pflanzen.

1. Verbindungen aus der Klasse der Fettkörper.
Kohlenwasserstoffe.

* According to the botanical system of Eichler.

- Alkohole.
 - Kohlenhydrate.
 - Organische Säuren.
 - II. Verbindungen aus der Klasse der aromatischen Körper.
 - Kohlenwasserstoffe.
 - Phenole.
 - Aromatische Alkohole and Aldehyde.
 - Aromatische Säuren.
 - Die wichtigsten Gerbmaterien des Handels.
 - Aetherische oder flüchtige Öle.
 - III. Pflanzenstoffe von unbekannter Constitution.
 - Glycoside.
 - Bitterstoffe.
 - Harze.
 - Balsame oder flüssige Harze.
 - Eigentliche Harze (Hartharze).
 - Gummiharze.
 - Pflanzenfarben.
 - B. Die stickstoffhaltigen Erzeugnisse der Pflanzen.
 - Pflanzenbasen oder Pflanzenalkaloide.
 - Proteinstoffe, Eiweißkörper oder Albuminate.
 - Nicht-eiweißartige stickstoffhaltige Pflanzenbestandtheile (Amidverbindungen).
 - Fermente.
- Dritter Abschnitt. Die anorganischen oder Mineralbestandtheile der Pflanzen (pp. 709–836).
- Vorkommen, Einäschern, Aschen-Analysen, etc.
 - Betrachtung der einzelnen anorganischen Pflanzenbestandtheile.
- Anhang.
- I. Bedeutung der Wälder für die chemische Industrie (Gewinnung von Potasche, Holzkohle, Holzessig, etc.).
 - II. Nachträge.
 - III. Tabelle.

For several decades phytochemistry has been specialized to such an extent that most of the important subdivisions have their special book literature. Especially noteworthy are the additions of the past few years.

In addition to these, attention should be called to another special field of phytochemistry, namely, to books on plant analysis.

ANLEITUNG ZUR CHEMISCHEN ANALYSE VON PFLANZEN UND PFLANZENTHEILEN auf ihre organischen Bestandtheile. Von Dr. G. C. Wittstein. Nördlingen. Verlag der C. H. Beck'schen Buchhandlung. 1868.

Inhaltsverzeichnis.

Einleitung (pp. 1–4).

ERSTE ABTHEILUNG.

Erster Abschnitt. Die bis jetzt in den Pflanzen gefundenen näheren Bestandtheile, ihre Darstellung, Eigenschaften und quantitative Bestimmung (pp. 7–240).

Zweiter Abschnitt. Uebersicht der Pflanzen, welche die im vorigen Abschnitte beschriebenen näheren Bestandtheile liefern (pp. 241–270).

Dritter Abschnitt. Uebersicht der Familien, welche die im vorigen Abschnitte genannten Pflanzen enthalten (pp. 271–278).

ZWEITE ABTHEILUNG.

Erster Abschnitt. Von den zur Ausführung von Pflanzenanalysen erforderlichen Apparaten (279-286).

Zweiter Abschnitt. Von den zur Ausführung von Pflanzenanalysen erforderlichen Reagentien (pp. 287-303).

Dritter Abschnitt. Allgemeiner systematischer Gang zur Ausführung von Pflanzenanalysen (pp. 304-355).

- I. Bestimmung des Wassergehaltes.
- II. Behandlung mit Aether.
- III. Behandlung mit Weingeist.
- IV. Behandlung mit kaltem Wasser.
- V. Behandlung mit kochendem Wasser.
- VI. Behandlung mit verdünnter Salzsäure.
- VII. Behandlung mit verdünnter Kalilauge.
- VIII. Destillation mit Wasser.
- IX. Destillation mit saurem Wasser.
- X. Destillation mit alkalischem Wasser.

Inasmuch as the bulk of Wittstein's book is devoted to a description of plant constituents, arranged alphabetically, and to an arrangement of these constituents according to the plants in which they occur, it might as well be grouped with the general works on phytochemistry. However, he himself calls it a "Guide to the chemical analysis of plants and parts of plants." Moreover, the author was provoked to write his treatise because he was dissatisfied with the method of analysis proposed by Rochleder. Hence the book should be grouped with others on plant analysis. It may be added that Dragendorff mentions it as second of the works on plant analysis to which he was indebted as his predecessors.

Wittstein's book was translated into English by Baron von Müller (Melbourne, 1878). The English title: "The organic constituents of plants and vegetable substances and their chemical analysis" is more in harmony with the bulk of its contents, but not so much with its tendency as in the original German title.

As further precursors of Dragendorff should be mentioned Arata's "Guja para el Analisis inmediato de dos Vejetales," Buenos Aires, 1869), and Parson's article in the first volume of the American Chemical Journal (pp. 375-391), entitled "A method for proximate analysis of plants." This article was published at the request of Professor Prescott, who evidently introduced Mr. Parsons into the subject of plant analysis, and who had worked out the method for his "Proximate organic analysis," the first edition of which appeared in 1874, and which is not restricted to plant analysis, but includes animal and synthetic products as well. One of the reasons given for the publication of this article is that Rochleder and Wittstein "fail to give clear and practicable directions for the quantitative estimation for each constituent."

Dragendorff's work in turn rests on all of these as well as on the experience gained by its author in the preparation of more than a hundred dis-

sertations by his students. The fundamental method is that of selective and, if as far as possible, indifferent solvents.

DIE QUALITATIVE UND QUANTITATIVE ANALYSE VON PFLANZEN UND PFLANZENTHEILEN, bearbeitet von Dr. Georg Dragendorff, o. Professor der Pharmacie an der Universität Dorpat. Mit eingedruckten Holzschnitten und einer lithogr. Tafel. Göttingen. Vandenhoeck & Ruprecht's Verlag. 1882.

Inhaltsübersicht.

Einleitung. § 1. Allgemeines über Pflanzenanalyse.—§ 2. Aufgaben für das vorliegende Buch, Eintheilung des Stoffes.—§ 3. Grundsätze für die Pflanzenanalyse (pp. 1–3). Gang der Analyse auf die wichtigeren Pflanzenbestandtheile.

- I. Vorbereitende Operationen, Trocken- und Aschenbestimmung (pp. 4–6).
 - II. Untersuchung der in Petroläther löslichen Substanzen. Aetherische und fette Oele, Wachs, etc. (pp. 7–28).
 - III. Untersuchung der in Aether löslichen Substanzen, Harze und verwandte Stoffe (pp. 29–34).
 - IV. Untersuchung der in absolutem Alkohol löslichen Substanzen, Harze, Gerbsäuren, Bitterstoffe, Alkaloide, Glycosen, etc. (pp. 35–61).
 - V. Untersuchung der in Wasser löslichen Substanzen: Schleim, Saponin, Säuren, Glycosen, Saccharosen und anderer Kohlehydrate (pp. 62–86).
 - VI. Untersuchung der in verdünnter Natronlauge löslichen Pflanzenbestandtheile. Metarabinsäure, Eiweisssubstanzen, Phlobaphene, etc. (pp. 87–89).
 - VII. Untersuchung der in verd. Salzsäure löslichen Bestandtheile: Amylon, Pararabin, Calciumoxalat, etc. (pp. 90–92).
 - VIII. Ermittlung des Lignins und verwandter Stoffe, sowie des Zellstoffs (pp. 93–94). Rückblick (pp. 95–96).
- Specialmethoden zur Bestimmung einzelner Pflanzenbestandtheile, Notizen und Ergänzungen zu den früher besprochenen Versuchen.
- Fette und deren Bestandtheile, Cholestrin, Filicin, etc. (pp. 97–109).
 - Chlorophyll und verwandte Körper (pp. 110–113).
 - Aetherische Oele, flüchtige Säuren, etc. (pp. 114–122).
 - Harze, Anthrachinonabkömmlinge, Gallensäure, Bitterstoffe, etc. (pp. 123–157).
 - Gerbsäuren (pp. 158–167).
 - Sonstige Glycoside (pp. 168–182).
 - Alkaloide (pp. 183–212),
 - Pflanzenschleim (pp. 213–217).
 - Dextrin, Triticin, Sinistrin, Levulin (pp. 217, 218).
 - Glycosen (pp. 219–230).
 - Säuren (230–238).
 - Eiweisssubstanzen, etc. (pp. 238–248).
 - Aminverbindungen (p. 248).
 - Stärkemehl, Lichenin, Holzgummi, etc. (pp. 253–256).
 - Zellstoff, Lignin und verwandte Körper (pp. 256–261).
- Procentische Zusammensetzung der besprochenen Pflanzenbestandtheile (pp. 262–270). Zusammensetzung der wichtigeren Pflanzenbestandtheile, nach dem Kohlenstoffgehalt geordnet (pp. 271–278).
- Alphabetisches Register (pp. 278–285).

This work was translated into English by a former student of Dragendorff, and published in London in 1884 under the following title :

Plant Analysis : Qualitative and Quantitative. By G. Dragendorff, Ph. D., Professor of Pharmacy in the University of Dorpat, Russia. Translated from the German by Henry G. Greenish, F. I. C. London : Baillière, Tindall and Cox. 1884.

Phytochemistry. B. E. Nelson. A modified scheme for the proximate analysis of vegetable drugs. *Am. Dr., Ph. Rec.*, 1902, II, p. 3.

HISTORICAL SKETCH OF THE ESTABLISHMENT AND ORGANIZATION OF THE UNITED STATES NAVAL HOSPITAL CORPS.

BY T. N. PHILLIPS, PHARMACIST, U. S. N.

Having been designated by the Surgeon-General as a delegate to represent the pharmacists of the Navy at the fifty-second annual meeting of the American Pharmaceutical Association, I have taken the present opportunity of bringing to your attention a few facts relating to the origin and development of the United States Naval Hospital Corps.

The establishment of a hospital corps in connection with the Medical Department of the Navy was a subject which occupied the thoughts of medical officers of the Navy for many years before it assumed definite shape, and long prior to its adoption and final enactment into law. The necessity for a disciplined and competent hospital corps to care for the sick and wounded officers and men of the Navy, ashore and afloat, was recognized throughout the service as an absolute necessity. Moreover, the creation and equipment of such a body of trained men was repeatedly urged from time to time upon those in authority, and its establishment was advocated as indispensable to the efficiency of the naval medical service, without which no naval organization could be regarded as fully equipped for duty in all of its co-ordinate branches. As far back as the establishment of the bureau system in the Navy Department, when by law the management of the Medical Corps of the Navy was placed under the direction of one of its own officers, recommendations having for their object the creation of a hospital corps were frequently the subject of consideration by several of the Chiefs of the Bureau of Medicine and Surgery. Suggestions of this character, however, involving as they did innovations on established customs, required years of agitation before any appreciable advance in the direction of progress could be reasonably expected. More especially was this to be anticipated in an organization so conservative in its history and traditions as that of the Navy Department, in which any departure from long-established usages and customs might not be regarded with the consideration which the importance of such a measure demanded. It may be of some interest to note in this connection that the same difficulties which attended and prevented the formation of a Naval Hospital Corps at home were encountered in a greater or less degree in the establishment of similar organizations by the principal foreign services. The British government very soon after the establishment of the Naval Medical

School at Hasler Hospital, organized in connection therewith a training-school for naval nurses. This school had its origin as the result of a report made by a special commission appointed by the Crown in 1884, in which special attention was directed by the commission to the great deficiencies and draw-backs connected with the proper care and comfort of British seamen at naval hospitals and on board English vessels of war. The French government about the same time, or possibly a few years earlier, organized a hospital corps similar in all essential details to that now existing in the British service. In our own army an act to establish a hospital corps was approved March 1, 1887, and since that date several amendments to the original law have been enacted, all in the direction of elaborating and perfecting its efficiency.

As a matter of general information it may not be without interest to learn how the sick and wounded of the navy were cared for before the hospital corps came into existence. Before this time the naval apothecary was appointed by the surgeon of the ship, for the cruise, with the approval of the commanding officer; or he was later enlisted, and then rated. The result was generally unsatisfactory to the apothecary or to the service, or both, and the position was not tempting to a competent man of good character. In our naval hospitals the nurses were oftentimes from an undesirable class of men, and whatever experience in nursing they acquired was gained only after residence of many months in the hospital, for they did not constitute a part of the enlisted force of the navy; they were not amenable to naval discipline, and if at any time their conduct proved insubordinate or insolent it was necessary to discharge them, thus depriving the hospital of their services, at the same time being unable by law to punish them for any infractions of the naval regulations. The plan of securing nurses (baymen, as they are called) for our war vessels, was equally as faulty as that which prevailed in our naval hospitals. As soon as a ship was placed in commission and her complement was received on board, a certain number of men, depending upon the rate of the ship, were detailed for duty as baymen, and ordered to report to the medical officer for duty. Selection of nurses made under these conditions, was disastrous to the welfare of the sick, and it was the exception rather than the rule that men designated for such service had ever previously been employed in the capacity of nurses, or that, from inclination or previous education, they were in the slightest degree qualified for their new duties.

The widespread interest manifested by the public in the creation of a modern navy during the period from 1880 to 1890, caused renewed effort on the part of the Medical Department in the establishment of a naval hospital corps. The substitution of steel and iron in the construction of modern ships of war necessitated the introduction and adaptation of new methods of handling wounded men. Many new problems presented themselves for consideration. Among others—

- (a) The disposition of the wounded on board ship during action.
- (b) The construction of ship ambulances.
- (c) The various methods for the transportation of the sick and wounded from different parts of the ship to the sick-bay.
- (d) Instructions relating to the equipment of landing parties.
- (e) Instructions to the crew in first aid to wounded.
- (f) The proper care of the sick and wounded ashore and afloat.

All of these subjects confronted the medical officer, and their fulfilment could only be accomplished by establishing a corps of men who by education and special training were qualified for the performance of such duties.

In his annual report to the Secretary of the Navy for the year 1895, Surgeon-General Tryon prepared and submitted to the Department a bill for the organization of a Naval Hospital Corps, requesting the Secretary's favorable action, and that it be transmitted to Congress with the Department's approval. The following year the bill, with some modifications, was again submitted for legislative consideration, but Congress failed to take any action in the matter.

Upon his appointment as Chief of the Bureau of Medicine and Surgery, Surgeon-General Van Reypen drew up and submitted to the Department, December 23, 1897, a new bill "To organize a hospital corps of the Navy of the United States, to define its duties and regulate its pay."

The proposed bill was favorably considered by the Department and transmitted to Congress, calling its attention to the urgent necessity for the establishment of a hospital corps; and after a full consideration of the measure by Congress, and without unnecessary delay, the bill became a law on the 17th of June, 1898.

The law as originally enacted provided for the appointment of twenty-five warrant pharmacists, and as many hospital stewards, hospital apprentices first class, and hospital apprentices as might be necessary to meet the requirements of the naval service. The original twenty-five pharmacists were appointed, after a careful examination of their records, from among the class of old apothecaries who had seen long and creditable naval service.

Soon after the establishment of the corps the Department recognized the necessity of promulgating certain regulations relating to the examination of hospital stewards to fill vacancies in the corps of pharmacists. The regulations provide that such examinations shall be conducted by a board consisting of two medical officers and one pharmacist, and the candidate is examined as to his mental, moral, professional and physical qualifications. It is expected that the candidate shall be able to write a legible hand, and have sufficient knowledge to prepare, under the directions of a medical officer, such returns as are used in the Medical Department. The professional examination comprises the following subjects:

- (a) Pharmacy.—General and practical.

(*b*) *Materia medica* and toxicology.—The supply table, pharmacopœia and poisons (symptoms and antidotes).

(*c*) Chemistry.—General and analytical (water and urinalysis).

(*d*) Minor surgery.—Demonstrations of the preparation and application of bandages and splints, names and uses of instruments and appliances on supply table, preparation of patients and operating room, anaesthetics, asepsis and antisepsis, dressing wounds and burns, first aid, handling and transportation of sick and injured.

(*e*) Management of sick bay and hospital wards.—Discipline, cleanliness, disinfection and fumigation, preparation of charts.

The physical examination is thorough, and the examination papers are marked on the basis of 600 as perfect. The following weights are assigned to the different subjects :

	Maximum.	Minimum.
Aptitude	100	80
Pharmacy	100	80
<i>Materia medica</i> and toxicology	100	75
Chemistry	100	60
Minor surgery	100	60
Management of sick bay and hospital wards.....	100	80
	600	435

The Association might be interested in learning something of the duties which are required of naval pharmacists. By the regulations pharmacists are classed as staff officers, and their duties pertain wholly to matters connected with the Medical Department of the Navy. When stationed at hospitals they are usually intrusted by the medical officer in charge with the preparation, under his direction, of all official papers, and have the supervision of all dispensary work. The efficient performance of such duties demands a high order of ability and carries with it great responsibility. When assigned to duty on board ship (always a hospital ship or flag-ship) he performs such duties as may be assigned him by the senior medical officer. The regulations require him to examine all medical stores and supplies received on board ship and report any defects or deficiencies. He is expected to exercise a careful supervision over the expenditure of medical stores, and to see that all stores issued are applied to the purposes for which intended. It is also his duty to see that the surgeon's directions for the care of the sick are duly complied with, and that good order is maintained in the medical department.

The last few years have seen a remarkable growth in the personnel of the hospital corps. With an annual increase for several years past in the personnel of the navy and marine corps there has been a corresponding enlargement in the hospital corps. The class of men now seeking to enter the hospital corps are far better qualified by education for filling

these positions than those presenting themselves a few years ago, before the corps was permanently organized, and the number of applicants is sufficient to permit a careful selection of good material. All sections of the country are now represented, whereas in former years recruits were almost entirely from the larger seaports on the coasts.

Surgeon-General Rixey, the present chief of the Bureau of Medicine and Surgery has recently established at the Naval Hospital, Norfolk, Va., a course of instruction for the better training of the hospital apprentices. Soon after their enlistment all hospital apprentices are sent to this school, where they remain under instructions covering a period of three months, and are instructed in the following subjects: Nursing, elementary anatomy, physiology, elementary hygiene, materia medica and pharmacy, bandaging and splints, first aid, discipline and drill. After this course of instruction is completed, each graduate is assigned to duty at a naval hospital for a further period of instruction with the object of acquiring a practical experience in the subjects embraced in the school curriculum. They are then considered available for detail to duty on stations and cruising ships.

The Surgeon General of the Navy, in his last annual report, in referring to the necessity for an increase in the grade of pharmacists, states:

"By the creation of the warrant grade of the Hospital Corps, Congress made provision for the advancement of the members of this branch of the medical department of the Navy, which has been a source of stimulation and encouragement to a deserving class of men. The number authorized, however, is not in keeping with the number of stations which from their size and importance call for the assignment of hospital corps men of the experience and standing only to be found in the members of this grade.

The Hospital Corps consists of approximately 700 members, and for this number there are only 25 places in the warrant grade, the highest position to which they can aspire. This holds out very little encouragement to the young men in the corps and offers little inducement for them to enter this field of naval work. All of the present list of pharmacists have from nine to thirty-one years' service to their credit, and it is only just to men of such long and faithful performance of duty that they be given the same benefits that are accorded to members of other warrant grades. It is, therefore, recommended that Congressional action be requested to provide for an increase of twenty-five in the grade of pharmacist, and that all laws in force or that may hereafter be enacted for the promotion and benefit of other warrant grades be made applicable to the grade of pharmacist."

It is a source of much pleasure to state that the records on file in the Medical Department of the Navy bear ample testimony to the steady advancement in the professional efficiency of the Hospital Corps, and the satisfactory manner in which they have adapted themselves to the necessities of the service is a convincing proof of the wisdom of those who were largely responsible for the establishment of such an organization. The corps is still in its incipency; obstacles and difficulties must be met and overcome; much remains to be accomplished in perfecting its organization, but its usefulness as a professional unit in contributing to the effi-

ciency of the Medical Department of the Navy has been clearly demonstrated, and fully justifies the efforts and services rendered by its friends, in and out of the service, in placing the corps upon a recognized and permanent basis.

PHARMACEUTICAL LEGISLATION, WITH SPECIAL REFERENCE
TO ANTI-NARCOTIC LAWS.

BY H. P. HYNSON, BALTIMORE.

The radical with patience is a much more comfortable being than is the conservative with hope. The one may reasonably expect the fruition of his desires when the proper season arrives ; the other is constantly being disappointed in the result of his measures of expediency.

Long ago, after several years of strenuous but resultless service as a member of a board of pharmacy, the writer became fully convinced that no great degree of success or satisfaction in pharmaceutic legislation will be attained until such legislation is based upon broader and, what one may be pardoned for calling, more common-sense principles ; principles which, however, would very likely be regarded as most radical, if not erratic, by the majority of pharmacists to-day. This want of popularity, in the light of history, as thrown upon other reforms, does not vitiate the principles involved, although it may, very properly, prove that the time for their application has not arrived, and that is why the radical with patience may comfortably wait.

That the actual compounder, dispenser or maker of each particular package that goes or even may go to the consumer, should be responsible for the identity, quality, proportions and preparation of the contents of every such package, seems right and reasonable. If this is so, then this should be the simple principle upon which general pharmaceutic legislation should be constructed. That the actual and direct purveyor of active, poisonous, abortifacient and possibly habit-forming medicines should be a person of intelligence, of special attainment, honest, conscientious and discreet ; and that his antithesis should not be allowed, without responsible order, to convey such medicines to the general public at all is another principle that seems right and proper and quite as reasonable. This then is the foundation upon which special poison, abortion and anti-narcotic laws should be built.

The details and application of laws so constructed seem as simple as the principles set forth. In the one instance he who would assume the responsibility must prove his fitness, respecting mentality and special acquirements, to legalized authority, which having been done he would be registered, given an official number, and furnished from time to time, as they may be required, and at a nominal cost, suitable certificates bearing his registration number and a fac-simile of his signature. One of these is to be placed upon each package for which he is responsible in such a

manner that the contents may not be used without destroying the certificate.

In the second instance the party desiring discretionary power to sell certain possibly-harmful medicines must have obtained registration by the authority before cited and afterwards must satisfy the same authority or some other properly legalized body, by his general and established reputation or by direct evidence that he is, in character and morals, worthy to be trusted with such special privilege, which privilege or license may be readily revoked, should he prove unworthy of the trust or fail to follow such rules and regulations as the authorized body may have established.

If these principles and the simple details do not appeal to the thoughtful student of the subject; if, through their application, he cannot see the shorter way to the end really sought and an escape from many of the difficulties which have been conspicuously in the way of the enforcement of enacted laws, from the beginning, then another mistake has been made; that's all.

It cannot be successfully denied, however, that every competent, discreet, honest, self-respecting, registered pharmacist should have full discretionary power in the sale of medicines, including narcotics; say what you may, this is necessary and, in spite of restrictive laws, will be exercised because public opinion, the stronger law, will protect it. And just as surely will general sentiment uphold and assist the enforcement of enactments which contemplate the denial of the privilege to those who misuse it; the mercenary, conscienceless, dishonest vendor, who must restrict his sales to those authorized by a physician or the body in control.

Professor Beal's splendid work for this Association along these lines is well in mind—gratefully in mind. It deserves the favorable comment it has received, and from his viewpoint, the point of expediency, it cannot be criticised. In his clear, concise address, introducing the draft of the bill he was requested to make, and in the draft itself he very properly, and it would seem finally, settles the questions referring to: the prescribing of narcotics; the medical treatment of habitues; the refilling of prescriptions for narcotics; penalties; revocation of general license. He does not, however, decisively answer the questions, "What substances should be included in the anti-narcotic law?" or, "Should the sale of proprietary medicines containing narcotic drugs be entirely prohibited?" There are very many things, fearfully dangerous in the hands of children and the vicious, which are most useful and become quite harmless in the hands of discreet persons, who have moral courage, well-controlled wills. It will not be safe to discriminate between weapons of different calibre or to argue that the blade will not do damage because it is not quite as long or near so keen as another. Is it not the hand that guides, after all?

A bill was prepared for the last Maryland legislature. It did not pass; indeed it never reached the state house. The legislative committee of the

State Pharmaceutical Association, after thorough consideration, approved it. The special committee of the State Medical Society, appointed for the purpose, heartily endorsed it. It was supported by the Health Commissioner of Baltimore, by the physician to the city jail, by the state's attorney for the city of Baltimore and by the leading pharmacists of the counties, and yet was held up by a few, through the influence of two, city pharmacists. It is hoped they did not understand it. They said it was too drastic, when it was "wide open" to the just. They said they were afraid of the proposed Commissioners; there were many who were not. It was prepared for Maryland, of course, and intended to meet certain local conditions, but the principle applicable to anti-narcotic laws herein set forth was the basis.

In the counties, control was to be given to local boards of health, which were in fact made up of the County Commissioners of the several counties. In almost every instance among the very best citizens of the county, and well acquainted with dealers and consumers; thoroughly familiar with local conditions. For Baltimore City a special board was sought. The chief health officer, the physician to city jail, and a reputable pharmacist, representing the interests involved: health, morals, pharmacy. If such a body could not be trusted, where and what is to be the refuge? To what trinity of interests could we better afford to make sacrifice? Yet, the bill is still a bill only; had it become an act, its promoters claimed that it would have been,

Easily enforced and effective.

Encouraging to all decent pharmacists.

Very objectionable to the vicious.

Adaptable to local conditions and requirements.

Free from hardships and causing no inconvenience.

A law tending to make pharmacists more respectable and pharmacy more respected.

Draft of proposed law:

A BILL

ENTITLED AN ACT TO REGULATE THE SALE OF POISONS AND TO RESTRICT AND CONTROL THE SALE OF HABIT-FORMING DRUGS AND MEDICINES.

*Section 1. Be it enacted by the General Assembly of Maryland, That from and after the passage of this act, it shall be unlawful for any person, firm or corporation to sell, dispense or dispose of any of the following chemicals, drugs or medicines, to wit: Arsenic, Mercuric Salts, Salts of Lead, Salts of Zinc, Salts of Copper, Nux Vomica, Ignatia, Aconite, Belladonna, Colchicum, Conium, Hyoscyamus, Digitalis, Strong Mineral Acids, Carbolic Acid, Hydrocyanic Acid, Creosote, Croton Oil, Essential Oil of Almonds, any derivative, compound or preparation of these or any of these, unless such person, firm or corporation shall plainly and conspicuously mark or label the box, vessel or paper in which any of the aforementioned chemicals, drugs, medicines, derivatives, compounds or preparations are contained, with the word *poison*, the English name of the substance together with the name and business address of the vendor.*

The provisions of this section shall not, however apply to liquids for internal use, containing any of the aforementioned chemicals, drugs, medicines, derivatives, compounds or preparations, if such liquids may be taken by an adult person in doses of one tea-spoonful or more and are so labeled; or to medicines for internal use sold or dispensed in divided doses that may be taken by an adult person; or to medicine for internal use, sold or dispensed upon the prescription of a registered physician, registered dentist or registered veterinarian, if the directions for their use appear upon a label attached to same.

Section II. And be it further enacted, That on and after the first day of May next, following the passage of this Act, it shall be the duty of the Secretary of the Maryland Board of Pharmacy, to register as *Jobbing Druggists*, all such persons, firms or corporations, desiring to conduct the business of selling drugs and medicines at wholesale, or desiring to conduct the business of manufacturing and selling pharmaceuticals as shall make written application for such registration and have the written indorsement of, at least, five reputable registered pharmacists in the State of Maryland, and who shall pay to the said Secretary a fee of one dollar. Each person, firm or corporation so registered shall be entitled to a certificate of registration. Such registration and certificate of registration shall expire on the first day of May next following the date of its issue, and may be renewed annually by the payment of a renewal fee of one dollar, on or before the day of its expiration. All fees collected under this section shall go to the Maryland Board of Pharmacy and be disposed of as are other fees collected by said Board.

Section III. And be it further enacted, That on or before the first day of May next following the passage of this Act, it shall be the duty of the Governor to appoint a reputable registered pharmacist, doing business in the city of Baltimore, who together with the Commissioner of Health for the city of Baltimore and physician to the Baltimore city jail, shall constitute a commission, to be known as the Baltimore License Board of the city of Baltimore, which Board may, at its discretion, upon the payment to it of a fee of one dollar, grant unto such persons, firms or corporations lawfully selling drugs and medicines in the city of Baltimore, as shall be deemed worthy of such privileges, a license to sell such of the chemicals, drugs, medicines, derivatives, compounds or preparations, mentioned in Section V. of this Act, as the aforesaid Board may, in its judgment, designate, and in such quantities and under such conditions, rules and regulations as it may establish or require. Such license shall be renewed annually upon the payment of a renewal fee of one dollar, and shall remain in force only so long as the Pharmaceutical License Board may see fit to continue its privileges. All fees paid to the said Board shall be used to defray its expenses, and all fees in excess of such expenses shall be divided among the several members of said Board.

Section IV. And be it further enacted, That in each of the counties in this State, the Local Board of Health shall exercise within each of the said counties respectively, the duties and powers imposed and conferred upon the Pharmaceutical License Board of the City of Baltimore.

Section V. And be it further enacted, That on and after the first day of July following the passage of this Act, none of the following chemicals, drugs or preparations, to wit: Opium, preparations containing Opium; Erythroxylon Coca, preparations containing Erythroxylon Coca; Morphine, Salts of Morphine, preparations containing Morphine or Salts of Morphine; Cocaine, Salts of Cocaine, preparations containing Cocaine or Salts of Cocaine; Eucaïne, Salts of Eucaïne, preparations containing Eucaïne or Salts of Eucaïne; Chloral Hydrate, preparations containing Chloral Hydrate; Ether, preparations containing Ether; Chloroform, preparations containing Chloroform; Ergot, preparations containing Ergot; Pennyroyal, Oil of Pennyroyal, preparations containing Pennyroyal or Oil of Pennyroyal; Savin, Oil of Savin, preparations containing Savin or Oil of Savin; Tansy, Oil of Tansy, preparations containing Tansy or Oil of Tansy, can be lawfully

sold, disposed of, or, in any way, supplied except by registered pharmacists, registered jobbing Druggists, or by firms or corporations managed by registered pharmacists or registered jobbing druggists. And it shall be unlawful for such registered pharmacists or registered jobbing druggists and firms and corporations managed by registered pharmacists or registered jobbing druggists to sell, dispose of, or, in any way, supply any of the aforesaid chemicals, drugs or preparations, except upon the original written prescription or order of a registered physician, registered dentist, registered veterinarian, registered pharmacist, or registered jobbing druggist, of the State of Maryland, and such original written prescription or order shall not be refilled or renewed, and shall be numbered and filed as the general custom with pharmacists. Such files shall be open, at all times, to the inspection of any or all members of the several boards mentioned in Sections III and IV, or any authorized deputy of the same.

Nothing, however, in this Act shall prevent the sale of such of the aforementioned chemicals, drugs, medicines or preparations as shall be designated by the several boards provided for in Sections III and IV of this Act, if labeled and marked as required for the poisons mentioned in Section II, and sold under special license and subject to the rules and regulations established and set forth by the aforementioned boards, and nothing in this Act shall be construed to prevent registered physicians, dentists or veterinarians from supplying any of the chemicals, drugs, medicines or preparations mentioned in this section, to their own patients, in reasonable quantities and for legitimate purposes.

Section VI. And be it further enacted, That it shall be unlawful for any physician, dentist or veterinarian to prescribe or supply any of the aforesaid chemicals, drugs, medicine or preparations for, or to, any habitual user of the same.

Provided, however, that the provisions of this section shall not be so construed as to prevent any lawfully authorized practitioner of medicine from prescribing or supplying, in good faith, for the use of any habitual user of narcotic drugs, such substances as he may deem necessary for the treatment of such habit.

Section VII. And be it further enacted, That any person violating this Act or any part of this Act, shall be guilty of a misdemeanor, and, upon conviction thereof, before any Justice of the Peace of the State of Maryland, shall be punished by a fine of not less than twenty-five dollars or more than one hundred dollars. Any person convicted a second time for a violation of this Act, or any part of this Act, shall be subject to the same fine, and, if a physician, dentist, pharmacist or veterinarian, may, at the discretion of the Court, forfeit all right to practice medicine, dentistry, pharmacy or veterinary surgery under any certificate of registration issued in accordance with the laws of the State of Maryland, and, if the same person be convicted a third time, such person shall be subject to the same fine and penalty and shall be imprisoned in jail for a term not to exceed thirty days. All fines collected in the City of Baltimore, under the provisions of this Act, shall be paid over to the Pharmaceutical License Board of the City of Baltimore, to be used in defraying the expenses of said Board, and all fines collected in any of the counties of the State, under the provisions of this Act, shall be paid over to the local Board of Health of the county in which such fine is collected.

Section VIII. And be it further enacted, That nothing in this Act shall be so construed as to grant to any person, firm or corporation any privilege, right or license that is not granted or allowed such person, firm or corporation by any law enacted to regulate the practice of pharmacy in the State of Maryland.

The chair stated that unless there was some new business—some motions or resolutions to offer—the installation of officers of the Section was the next order; but that might well be dispensed with, under the circumstances.

Mr. Wilbert moved to dispense with the reading of the minutes, which motion carried, and then, upon motion of Mr. Wescott, the Section stood adjourned *sine die*.

MINUTES

OF THE

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

FIRST SESSION—WEDNESDAY EVENING, SEPTEMBER 7, 1904.

The Section was called to order in the banquet room of the hotel at 9 : 10 p. m., with Chairman W. H. Burke presiding.

Mr. W. L. Cliffe was asked to take the chair while Mr. Burke read his address :

Fellow Members : The line that divides practical from commercial pharmacy is so fine at some points of contact that it is almost indiscernable. There are very few pharmacies in the United States that do not combine the two; there are very few pharmacists who are not interested in both; about the only place where commercial pharmacy is a stranger, is in the schools of pharmacy.

The National Association of Retail Druggists is an offshoot of the Commercial Section, but they do not consider commercial questions in the same manner that they were considered by our commercial section, before the formation of the separate association.

The facts are, that the Commercial Section has lost a great deal of its attraction for our members, and the chairman of this section can see no good reason why the two sections should not be combined. I am sure that it would be a great deal easier for a committee to secure papers and exhibits if it had the whole field to work from. The work could also be carried on with less expense to the Association.

It is often difficult to decide whether a subject belongs to the practical or to the commercial side; an amalgamation would solve this and leave a lot of time for the committee to drum up interesting material.

There is no doubt that the pharmacists are very backward in exploiting the professional side of the art of pharmacy. They play a waiting instead of a pushing game. The tendency is to let the medical profession and the laity find out for themselves that we are qualified and equipped to discharge our duties, rather than to forcibly remind them of it. This condition undoubtedly emanates from an innate sense of modesty on the part of pharmacists. Whatever its source, it must be condemned. The hurrying age is not one calculated to bring you and your attainments into prominence without aggressive effort on your part. A Russian count traveling in the United States made the statement

in the earlier part of the year that one trouble with the Russians was that they were poor advertisers. I think that this same accusation can well lie against the pharmacists. In the past few years we have noticed that there has been a tendency on the part of a few followers of the art to extricate themselves from this rut, and it has invariably been followed by success.

We must adopt the same means to exploit our skill and our products that the successful manufacturing houses have used, and improve upon them if we can. Owing to the fact that the manufacturing pharmacist must exploit his products a long distance from home places him at some disadvantage. It is a much simpler problem to convince medical men that you are possessed of the requisite skill, and that you work only with most carefully selected materials than it is for a foreigner to do it. The development of this ability on the part of retail pharmacists—to impress the medical profession with his preparedness to supply most of the preparations and mixtures necessary to use in the practice of the healing art—is second only to the knowledge, skill and practice necessary to make a pharmacist.

Very few of the synthetic remedies on the market to-day have the doses printed on the label. We are unable to see why this should be so, and believe that the adoption of a dose label would be gladly welcomed by the busy pharmacist who cannot always find the literature giving the necessary information.

The number of new remedies does not seem to decrease, but the number that obtain a successful and continuous sale is not so large. There must be some consolation for us in the fact that the selection of the useful and salable, and the avoidance of the "dead ones," requires the display of considerable knowledge and judgment. We must all realize that if we had quinine, calomel and potassium iodide as the sum total of medicaments, every pharmacist in the land would have a complete stock and be an expert dispenser.

The fact that a great many of the new remedies come from abroad as patented chemicals, some of which are exploited in this country at a price much higher than can be obtained in the countries from which they come, has influenced pharmacists in America to seek relief through an amendment of our patent laws. One of the most forcible arguments used is "that these products secure greater protection here than they can get at home." The remedy offered for this condition is that contained in the so-called Mann bill, the granting of a patent on the process only. Now this would give very little protection to the manufacturer in this country, although it affords a pretty good protection in Germany. There every man who markets a product similar to something already on sale must prove that his process is different; here, as you know, the burden of proof would be on the original inventor; he would have to drag the imitator into court and prove that his process had been infringed—a very difficult and almost impracticable thing to do. The A. Ph. A. has always opposed secrecy in medicinal compounds. The creators of new chemical compounds, or some of them at least, finding that the patent laws no longer afforded them protection, would undoubtedly follow the example set by the proprietary medicine men and market their products without obtaining patents, depending entirely on the trade-mark to protect their interests. As you well know, this trade-mark would last for all time, and it may, therefore, be well doubted whether it would not be wiser to grant immunity to an inventor for seventeen years rather than force him to continue his exactions forever. We must all admit that there is as much anti-kamnia sold in the United States to-day as there is of phenacetin. We must also admit that there is at least as large a margin of profit for the manufacturer, and we must appreciate the fact that the year 1906 will bring with it no relief from the present price in the one case, while it will bring absolute relief in the other.

We admit that a great many of these chemical products are valuable; we know that they require a great deal of research, and it cannot be denied that the education of the medical and pharmaceutical professions in their uses requires the expenditures of vast

sums of money, and we must expect the inventors and their financial backers to recoup themselves for this outlay.

This is not the place and time for an extended discourse on product patents, and these few remarks are only offered here in order that proper study and consideration of the matter may be made before final conclusions are reached.

The question might be well asked, Do we scan the chemical and pharmaceutical field as closely as we should? Do we watch the introduction of the new preparations as they are brought out? How often are we asked for information about some new drug or preparation that we cannot recall ever having heard of before? It is no easy task to anticipate the wants of our clientele; but by referring to the advertising pages of some of the medical journals; by having our names placed on the mailing-lists of the various agents for chemicals, as well as the manufacturing pharmacists; and by a careful perusal of the pharmaceutical journals, we can generally be prepared to say "Yes" when those things are asked for.

Does the average pharmacist use the very best judgment in pricing prescriptions? Before answering this question, it would be well for us to compare the practice in vogue in pharmacy with the charges made by the medical, dental and legal professions. We are familiar with the great range of prices that obtains in medicine. We know that the capable, educated and successful practitioner ignores the fee tendered to and accepted by his less skillful and capable brother; and demands fair and reasonable pay for his services. In dentistry we note a similar condition. There are dentists that demand five dollars an hour and there are others who will work for one dollar an hour. In law a still greater difference is to be found, one lawyer demanding one hundred dollars a day and another willing to accept five dollars a day. Let us turn away from the professions to see what practice prevails in commercial callings. We are all familiar with hotel charges. We know that some are willing to keep us for five dollars a day while others are glad to get us for one dollar a day. The milliner and the dressmaker make their charges proportionate to the skill and experience possessed, and the reputation enjoyed in the community in which they live. I think we all appreciate the fact that no such disparity of price characterizes the charges of pharmacists. Although the capable and careful dispenser who furnishes a service that is worth a great deal more than his neighbors, realizes that he is placing too low a valuation on his own professional skill, he is extremely slow about raising his fee.

It may be that the pharmacist hesitates to exact his just dues from suffering humanity. If this is one of the causes, we must admit that it is a mistake, for that portion of the race unable to provide themselves with medical attendance and drugs are provided for by the community as a whole, in the various hospitals, sanitariums and retreats maintained by the people, and to whose support the pharmacist must contribute his share, which is all that can be reasonably expected from him. Whatever the reason, it is to be hoped that we will ponder over this phase of our calling until we get as much gumption as ordinary tradesmen possess.

The rise of the manufacturing pharmacist witnesses the retail pharmacist relieved from many of the duties he once performed. Whether this has helped him or not, the world does not stop to inquire. It certainly has given him leisure, so that he can find out about a few of the things the other fellows are making, and post himself on their history and use. It would seem as if the future would hold in store for us a continuation of the same scheme. We will not be relieved of all responsibility, however, for the signs of the times indicate more and more that a pharmacist must know that the preparations which he sells correspond to recognized standards—not merely because some seller has assured him of it—but by having tested them for himself. The practical pharmacist of the future, who is a graduate in pharmacy, who has a high school training, who has had a course in bacteriology, who can properly inspire medical men with con-

fidence in him and his ability, will not need to rely on plans to minimize the so-called ills of competition. In closing, I wish to thank the members for the assistance given the committee in the preparation for the work of this section. There is no one who can appreciate more than your Chairman how much effort is required to furnish material for this section that will be new and interesting. I believe that our contributors are veritable heroes, and I sincerely hope that you will listen to their efforts with the interest and appreciation which they so richly deserve.

Mr. Good moved to receive the address and refer for publication.

Mr. Wilbert said the Chairman had made some recommendations, and it would be well to have a committee to act on them. The Chair called on Mr. Burke to state his recommendations, and he said the first was that the Commercial Section be consolidated with the Section on Practical Pharmacy and Dispensing. Mr. Sheppard moved that this Section recommend to the Association in general session that this be done. Mr. Hynson, to whose initiative was due the organization of the Section on Practical Pharmacy and Dispensing, made an impassioned appeal to the members against the proposition to consolidate the two Sections. He said that each Section had its own proper work to do, that the field was wide enough for both, and that it would be a fatal mistake to do it. Mr. Sheppard argued for his motion to consolidate, and the proposition was discussed by Messrs. Wescott, Eliel, Hallberg, Sherman, Hynson, Carter, Ebert, Diehl, Hopp, Burke and Kirchgessner. The Chair put the vote on the motion to consolidate, and it was defeated by a vote of 39 opposed to 9 for the measure.

Mr. Burke said the only other recommendation in his address as Chairman was that manufacturers be asked to put the dose on synthetic preparations. Mr. Wilbert said this was more in the form of a suggestion, and the matter was not pressed.

Mr. Burke resumed the Chair and called for the report of the Committee on National Formulary. Mr. Diehl, Chairman, read the report as follows:

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.

To the President and Members of the American Pharmaceutical Association:

The time having now arrived when it becomes practicable to prepare the text for the second revised edition of the National Formulary, it was considered an important necessity that a condensed review of the work done by your committee, as given in detail in the reports of 1901, 1902 and 1903, should be prepared, so that the committee may intelligently vote upon the necessary changes in existing formulas and on the admission of formulas for desirable preparations not heretofore included. Such a review it affords me pleasure to submit in the following, including also the work that has been done since our last meeting (designated "1904"), which will be mentioned in detail further on, together with such comments and recommendations as may serve to bring to satisfactory completion a work which past experience has proven to be an acceptable supplement to the United States Pharmacopoeia.

In the revision of any work or treatise a two-fold object is in view—the correction (elimination) of possible errors, and the addition of newly-ascertained facts connected with the subjects embraced by the work or treatise. So in the revision of the National

Formulary we have two principal objects, the correction of existing formulas, and the addition of formulas for preparations in popular demand for which no authoritative formulas exist—the “correction” being easily the most important consideration. It speaks well for the present “Formulary” that of the total number of formulas (454) only 18 per cent. (82) seemed to require correction, and that the

Corrections of formulas necessary, in the majority of cases, were quite trivial. Nevertheless, the labor involved was considerable, and that it was thorough and painstaking may be inferred from the fact that in many instances the same preparation was reported on in two or all three of the reports, as may be noted in the following:

I. LIST OF PREPARATIONS FOR WHICH CORRECTIONS HAVE BEEN PROPOSED BY THE
SUB-COMMITTEE ON CORRECTIONS.

A. B. Stevens, Chairman, 1902 and 1903; H. P. Hynson, Acting Chairman, 1904.

	1902.	1903.	1904.
10. Aqua hamamelidis spiritiosa	“	“	“
12. Balsamum traumaticum.	—	—	“
14. Boroglycerinum	—	—	“
17. Carbasus carbolata	—	—	“
18. Carbasus iodoformata	—	—	“
20. Ceratum extracti cantharidis.	—	—	“
23. Chloral camphoratum.	“	“	—
31. Elixir adjuvans	“	“	“
33. Elixir ammonii valerianatis	—	“	—
37. Elixir bismuthi	—	—	“
43. Elixir calcii hypophosphitis.....	—	“	—
45. Elixir catharticum compositum.....	“	“	—
47. Elixir cinchonæ.	“	“	—
48. Elixir cinchonæ detannatum	—	“	—
49. Elixir cinchonæ et hypophosphitum.	—	—	“
52. Elixir cinchonæ, ferri et bismuthi	—	—	“
54. Elixir cinchonæ, ferri et pepsini	—	—	“
59. Elixir digestivum compositum	“	“	—
61. Elixir erythroxyli.....	—	“	—
62. Elixir erythroxyli et guaranæ	—	“	—
76. Elixir glycyrrhizæ.....	—	“	—
81. Elixir hypophosphitum	—	“	—
82. Elixir hypophosphitum cum ferro	—	“	—
88. Elixir pepsini	“	“	—
89. Elixir pepsini, bismuthi et strychninæ	—	“	—
90. Elixir pepsini et bismuthi	—	“	—
97. Elixir potassii bromidi	“	—	—
98. Elixir quininæ compositum.....	“	—	—
101. Elixir rhamni purshianæ	—	“	—
106. Elixir sodii bromidi	—	—	“
107. Elixir sodii hypophosphitis.....	—	“	“
123. Emulsiones	—	—	“
124. Emulsio olei morrhuæ	—	—	“
185. Glyceritum bismuthi.....	“	“	—
187. Glyceritum pepaini.....	—	“	—
195. Lac fermentum.....	—	“	—
206. Liquor acidi phosphorici compositus.....	—	“	—
211. Liquor auri et arsenii bromidi.....	—	“	—

	1902.	1903.	1904.
212. Liquor bismuthi	"	—	—
215. Liquor carmini	—	—	"
216. Liquor coccineus	—	—	"
225. Liquor hypophosphitum	—	"	—
226. Liquor iodi carbolatus	—	"	—
231. Liquor morphinæ hypodermicus	"	"	—
232. Liquor pancreaticus	—	"	—
233. Liquor pepsini	—	—	"
234. Liquor pepsini aromaticus	—	"	—
235. Liquor phosphori	—	"	—
250. Liquor zingiberis	—	"	—
261. Mistura chlorali et potassii bromidi composita	"	"	—
264. Mistura copaibæ composita—I (Lafayette mixture)	"	—	"
331. Pulvis salis carolini factitii effervescens	—	—	"
355. Spongia decolorata	"	—	—
356. Succus limonis cum pepsino	—	"	—
357. Syrupus actææ compositus	—	"	—
360. Syrupus calcii et sodii hypophosphitum	—	"	—
361. Syrupus calcii hypophosphitis	—	"	—
363. Syrupus calcii lactophosphatis cum ferro	—	"	—
371. Syrupus ferri citro-iodidi	"	"	—
378. Syrupus hypophosphitum compositus	"	"	—
385. Syrupus phosphatum compositus	—	—	"
386. Syrupus pini strobi compositus	—	—	"
393. Syrupus sodii hypophosphitis	—	"	—
394. Syrupus stillingie compositus	—	"	—
400. Tinctura antiperiodica	—	"	—
404. Tinctura conii	—	"	—
407. Tinctura ferri citro-chloridi	"	"	—
410. Tinctura ignatiæ (U. S. P., 1880)	—	—	"
426. Tinctura vanillini composita	—	—	"
441. Vinum album fortius (U. S. P., 1880)	—	"	—
442. Vinum aurantii	—	"	—
444. Vinum carnis	—	"	—
445. Vinum carnis et ferri	"	"	—
450. Vinum pepsini	"	"	—
452. Vinum pruni virginianæ	—	"	—
454. Vinum rhei	—	"	—

LIST II. PREPARATIONS RECOMMENDED TO BE DISMISSED FROM THE N. F.

a. By the Committee on Correction of Formulas.

	1902.	1903.	1904.
12. Balsamum traumaticum (Hynson)	—	—	"
14. Boroglycerinum (Hynson)	—	—	"
17. Carbasus carbolata (Hynson)	—	—	"
18. Carbasus iodoformata (Hynson)	—	—	"
20. Ceratum extracti cantharidis (Hynson)	—	—	"
47. Elixir cinchonæ (Stevens)	—	"	—
48. Elixir cinchonæ detannatum (Stevens)	—	"	—
68. Elixir ferri phosphatis, cinchonidinæ et strychninæ (Stevens)	—	"	—
98. Elixir quininæ compositum (Stevens)	—	"	—

	1902.	1903.	1904.
124-4. Quillaja emulsion of cod-liver oil (Hynson)	—	—	"
216. Liquor coccineus (Hynson)	—	—	"
233. Liquor pepsini, U. S. P., 1880 (Stevens)	—	"	—
426. Tinctura vanillini composita (Hynson)	—	—	"
b. By E. G. Eberle.			
371. Syrupus ferri citro-iodidi	—	—	"
446. Vinum carnis, ferri et cinchonæ	—	—	"

Leaving out of consideration the long list of preparations proposed for admission into the "Formulary" under "Exhibit A" in the report of this Committee of 1901, the following is a list of

LIST III. PREPARATIONS PROPOSED FOR ADMISSION INTO THE N. F.,

which have been considered in the reports of 1901-1904 inclusive:

Campho-menthol (Hallberg)	1902
Elixir of gentian, glycerinated (Scoville)—Ohio Ph. A.	1901
Elixir glycerophosphates (Bamford)—Phil. Col. Ph.	1904
Elixir glycerophosphates, compound (Bamford)—Phil. Col. Ph.	1904
Elixir glycerophosphates of lime and soda (Bamford)—Phil. Col. Ph.	1904
Elixir licorice, "old form," No. 70, N. F., 1888 (Mittelbach)	1904
Elixir phosphorus compound—Mo. Ph. A.	1901
Elixir rhamnus purshiana, "sweet"—Mo. Ph. A.	1901
Elixir saw palmetto and sandal wood comp. (Raeuber)	1901
Elixir terpin hydrate (Kaemmerer)	1902
Elixir terpin hydrate with codeine (Kaemmerer)	1902
Elixir terpin hydrate with heroine (Kaemmerer)	1902
Emulsion of petroleum (Scoville)	1902
Essence of pepsin (Raeuber)—Ohio Ph. A.	1901
Fl. Extr. of rhamnus purshiana, "alkaline" (Scoville)	1902
"Germicide" (Scoville)	1903
Glycerogelatin of iodoform, 10 per cent. "Unna" (Hallberg)	1903
Glycerogelatin of salicylic acid, 10 per cent. "Unna" (Hallberg)	1903
Glycerogelatin of zinc, "hard" (Hallberg)	1903
Milk, humanized (Emanuel)	1901
Milk, humanized, powder (Emanuel)	1901
Milk of magnesia, "magnesia magma" (Scoville)	1901
Ointment for salve-mull, mercuric chloride (Hallberg)	1903
Ointment for salve-mull, mercurous chloride (Hallberg)	1903
Ointment resorcin compound (Emanuel)	1901
Ointment rose water with petrolatum (Emanuel)	1902
Ox gall, dried—Ohio Ph. A.	1901
Pastes, dermatological (zinc, resorcin, naphthol, ichthyol, zinc "sulphurated," dextrinated, kaolin) (Hallberg)	1903
Pencils (stili dilubiles, Unna) (Hallberg)	1903
Petrolatum, capsicum (Hallberg)	1902
Powder, alum, compound "Squibb" (Hallberg)	1902
Powder, antiseptic (Hallberg)	1902
Quinine glycyrrhizin (tablets)—Ohio Ph. A.	1901
Salve-mulls (Hallberg), see ointments (Hallberg)	1903
Sodium phosphate, liquified (Scoville)	1903
Solution, antiseptic (Hynson) (Scoville)—Mo. Ph. A.	1901
Solution, alkaline antiseptic (Scoville)	1903

Solution of cresol; Liq. disinfectans (Scoville)	1901
Solution of cresol, saponated; Tinct. cresoli sapon. (Scoville)	1901
Solution of hypophosphites, comp.—Ohio Ph. A.	1901
Solution of iron albuminate (Scoville)	1903
Solution of iron and manganese peptonate—Mo. Ph. A.	1901
Solution of iron peptonate (Scoville)	1903
Suppositories of boroglyceride (Scoville)	1903
Syrup of bromides (Scoville)	1903
Syrup of ipecac, "permanent"—Mo. Ph. A.	1901
Syrup of licorice, "aromatic"—Mo. Ph. A.	1901
Syrup of quinidine, "tasteless"—Mo. Ph. A.	1901
Syrup of quinine phospho-mur. comp. (Raeuber)	1901
Syrup of red poppy—Mo. Ph. A.	1901
Syrup of white pine comp. with tar (Raeuber)	1901
Tincture of rhamnus purshiana, "sweet"—Mo. Ph. A.	1901
Tincture of tolu comp. "for pill-coating" (Hynson)	1904
Zinc stearate, "Niece" (Scoville)	1904

LIST IV.

To these formulas must be added the following:

Definitions of Forms Suitable for Dosage.

Capsules, gelatin (hard capsules)—Hallberg, 1903; Hynson, 1904.	
Capsules, glycerogelatin (soft caps.)—Hallberg, 1903; Hynson, 1904.	
Capsules, starch (cachets, con-seals)—Hallberg, 1903; Hynson, 1904.	
Granules (small pills)—Hallberg, 1903.	
Pastilles (troches), cacao—Hallberg, 1903; Hynson, 1904.	4
Pastilles (troches), gelatin—Hallberg, 1903.	
Pills, forms—Hallberg, 1903.	
Pills, coated with cacao—Hallberg, 1903.	
Pills, coated with gelatin—Hallberg, 1903; Hynson, 1904.	
Pills, coated with silver—Hynson, 1904.	
Pills, coated with sugar—Hallberg, 1903.	
Pills, coated with tolu—Hallberg, 1903; Hynson, 1904.	
Pills, enteric:	
a. with keratin coating—Hallberg, 1903.	
b. with salol coating—Hallberg, 1903; Hynson, 1904.	
Powders, in papers—Hallberg, 1903.	
Tablets, hypodermic—Hallberg, 1903.	
Tablets, triturates—Hallberg, 1903.	

LIST V. CRITICISMS ON PREPARATIONS PROPOSED FOR ADMISSION

Have been made as follows:

Elixir, gentian, glycerinated (Hemm)	1904
Elixir, terpin hydrate with heroine (Eberle)	1904
Emulsion, petroleum (Hemm)	1904
Ointment, resorcin, compound (Eberle)	1904
Solution, antiseptic (Hemm)	1904
Solution, alkaline antiseptic (Eberle)	1904
Solution, iron albuminate (Hemm)	1904
Solution, iron peptonate (Hemm)	1904

LIST VI. NEW FORMULAS REPORTED FOR ADMISSION INTO THE N. F. BY THE SUB-COMMITTEE ON CONSTRUCTION OF FORMULAS.

W. L. Scoville, Chairman.

	1902.	1903.	1904.
Elixir of gentian, glycerinated.....	"	—	"
Elixir of glycerophosphates	—	—	"
Elixir of terpin hydrate	—	"	—
Elixir of terpin hydrate with codeine	—	"	—
Elixir of terpin hydrate with heroine	—	"	—
Emulsion of petroleum.....	"	—	"
Fld. extr. of rhamnus pershiana, "alkaline"	"	—	"
"Germicide".....	—	"	—
Ointment of resorcin, compound	—	"	—
Powder, antiseptic, "soluble".....	—	"	—
Sodium phosphate, liquified.....	"	—	—
Solution, antiseptic	—	"	"
Solution, alkaline antiseptic	—	"	"
Solution of cresol (Liquor disinfectans).....	"	"	—
Solution of cresol, saponated; (Tinct. cresol. sapon.).....	"	"	—
Solution, hypophosphites.....	"	—	—
Solution, iron albuminate	"	—	—
Solution, iron and manganese peptonate.....	—	"	—
Solution, iron peptonate	"	—	—
Suppositories of boroglyceride	—	"	—
Syrup of bromides	—	"	—
Syrup of quinidine.....	"	—	—
Syrup of quinine and strychnine phosph. comp	—	"	—
Zinc stearate (Niece).....	—	—	"

LIST VII. AVAILABLE FORMULAS NOT REPORTED BY THE COMMITTEE ON CONSTRUCTION OF FORMULAS.

Elixir of glycerophosphates compound (Bamford)—Phil. Col. Ph.....	1904
Elixir of glycerophosphates of lime and soda (Bamford)—Phil. Col. Ph.....	1904
Elixir of glycerophosphates with iron (Bamford)—Phil. Col. Ph.....	1904
Elixir licorice, "old form," No. 70, N. F., 1888 (Mittelbach)	1904
Elixir rhamnus purshiana, "sweet"—Mo. Ph. A	1901
Elixir phosphorus comp.—Mo. Ph. A	1901
Elixir saw palmetto and sandalwood comp. (Raeuber)	1901
Elixir white pine compound with tar (Raeuber)	1901
Essence of pepsin (Raeuber)	1901
Glycerogelatin of iodoform, 10 per cent. "Unna" (Hallberg)	1903
Glycerogelatin of salicylic acid, 10 per cent. "Unna" (Hallberg)	1903
Glycerogelatin of zinc, "hard" (Hallberg)	1903
Milk, humanized (Emanuel).....	1901
Milk, humanized, powder (Emanuel)	1901
Ox-gall, dried, Ohio Ph. A	1901
Pastes, dermatologic, as previously enumerated, see List III (Hallberg)	1903
Quinine glycyrrhizin (tablets)—Ohio Ph. A.	1903
Salve—Mull ointments, see List III (Hallberg)	1903
Syrup of ipecac, "permanent"—Mo. Ph. A.....	1901
Syrup of licorice, aromatic—Mo. Ph. A.....	1901
Syrup of red poppy—Mo. Ph. A.....	1901

Tincture of rhamnus purshiana, "sweet"—Mo. Ph. A.....	1901
Tincture of tolu, compound, for pill-coating (Hynson)	1904

Coming now to a detailed statement of the work done during the year 1903-04, I desire first of all to acknowledge, with my sincerest thanks, the valuable assistance which I have received from the members of the committee, and particularly from the chairmen of the sub-committees, in furtherance of the revision of the "Formulary" since the committee was re-organized for this purpose in 1900. The preceding review of the work done bears ample testimony that whatever of value has been accomplished must be largely credited to the faithful and assiduous labors of the chairmen of the sub-committees, not forgetting the present acting chairman of the Sub-Committee on Corrections of Formulas, Mr. Henry P. Hynson, who, on the departure of Professor Stevens for a prolonged sojourn in Europe, very cheerfully consented to assume the duties of the chairman of that important sub-committee.

Early during the present year (March 16, 1904) a circular letter, enclosing reprints of the reports of 1901, 1902 and 1903, was addressed to all of the members of the committee, with the request to select from these reports a list of the preparations that should, in their individual opinion, be recommended for admission, modification or change in a final report to be presented at the meeting of the Association in Kansas City, and to report to me not later, if possible, than July 16, 1904. Including reports from the chairmen of the sub-committees, responses to this request were received at this date (August 12, 1904), only from five members, and it is clear that a final decision can only be reached by personal conference when we meet at Kansas City. Such a

Conference of the Committee was held at Mackinac Island (Aug. 7th, 1903) at which the following conclusions were reached:

1. It was decided to reject the following from the list of formulas proposed (see "Exhibit A," Report 1902):

Elixir ammonium valerianate with morphine.

Extract of pinus canadensis (dark).

Formaldehyde.

Pulvis sennae comp.

Syrupus pruni virg. et codeinæ.

Tincture smilax pseudo-chinæ comp.

2. In accordance with the views expressed by the Section on Practical Pharmacy and Dispensing, names of a proprietary character are to be dropped from the reports of the sub-committee.

3. On motion of E. G. Eberle, it was decided that the names of the N. F. preparations be as short as possible, but such as to indicate as near as possible the constituents, and that "coined" names be not utilized.

Those at this conference were: Caspari, Mittelbach, Hallberg, Meissner, Eberle (Acting as Secretary) and Diehl.

It is impracticable to embody the responses and reports received *verbatim*; with my apologies to the writers these are here given as follows:

In his

Report of the Sub-Committee on Correction of Formulas, referring to the report of that sub-committee adopted at Mackinac Island, Mr. Hynson suggests,

Firstly, That in the interest of practicability and perfection several changes are in his opinion necessary, as follows:

No. 31. *Elixir Adjuvans*.—Two formulas are proposed. Reject the first and insert only the second formula, which requires the use of primary ingredients, found in every pharmacy, and is quite simple. The directions also should be changed to read as follows: "Dissolve the saccharin, by the aid of sodium bicarbonate, in the water," in which solution the extract of licorice should then be dissolved.

No. 49. *Elixir Cinchona et Hypophosphitum*.—Substitute in this hypophosphorous acid for citric acid, as has been proposed in other formulas containing hypophosphite.

Secondly, He would have the committee consider the advisability of some additional changes, viz.:

No. 10. *Aqua Hamamelidis Spirituosa*.—This being called and known as "Distilled Extract of Witchhazel," the title should be changed to make it correspond to usage.

Bismuth Solutions, in which the bismuth-ammonium citrate is now used, should be made from the non-volatile bismuth-sodium tartrate, as represented in the glycerite proposed; and as examples the following formulas are suggested:

No. 37. *Elixir Bismuthi*.—Glycerite of bismuth (new form), 125 Cc.; glycerin, 125 Cc.; water, 250 Cc.; aromatic elixir, q. s. to make 1000 Cc.

No. 52. *Elixir Cinchona, Ferri et Bismuthi*.—Glycerite of bismuth (new form), 65 Cc.; water, 65 Cc.; elixir of cinchona and iron, q. s. to make 1000 Cc.

Pepsin in Solutions is best introduced in the form of the glycerite. The formula for

No. 54. *Elixir Cinchona, Ferri et Pepsini*, for instance, is unscientific, and although little used should be altered, perhaps as follows: Glycerite of pepsin, 200 Cc.; Elixir of cinchona and iron, q. s. to make 1000 Cc.

No. 106. *Elixir Sodii Bromidi* and

No. 107. *Elixir Sodii Hypophosphitis* call for the addition of citric acid. This seems useless, and even harmful, liable to induce fungoid growths and, in some combinations, to produce incompatibility.

No. 123. *Emulsiones*.—Those containing acacia quickly ferment and separate. Quillaja or saponin, which are undoubtedly poisonous, should not be used. The question of emulsions, although a much discussed subject, is still inviting. Our work upon them has not been satisfactory. Are antiseptics and antiferments allowable, and if so, which?

No. 215. *Liquor Carmini*.—Greater stress should be laid in the directions upon the desirability of having the finished product neutral.

No. 233. *Liquor Pepsini*.—The following formula is suggested: Glycerite of pepsin, 50 Cc.; hydrochloric acid, 10 Cc.; glycerin, 300 Cc.; water, q. s. to make 1000 Cc. The acid and alcohol are mixed with 500 Cc. of water, the previously mixed glycerite and glycerin added, followed by enough water to make 1000 Cc.

No. 264. *Mistura Copaibae Composita*.—I. Lafayette Mixture.—Use mucilage of acacia instead of mucilage of dextrin, for reasons previously stated to the committee, and favorably reported on at Philadelphia.

No. 386. *Syrupus Pini Strobi Compositus*.—Is rendered palatable and more like the many now marketed if a 10 per cent. alcoholic menstruum is used instead of the present stronger solvent. It is questionable whether or not the medicinal value is really impaired by this modification.

No. 385. *Syrupus Phosphatum Compositus*.—Mr. Hynson also calls attention to a suggestion offered by Prof. Scoville, which is designed to insure a permanently clear "Chemical Food." It consists in increasing the citric acid to 80 Gm. and the glycerin to 350 Cc., and in reducing the phosphoric acid to 100 Cc. and the sugar to 300 Gm. The product will remain clear indefinitely. Made by the present formula it begins to deposit in about a week and keeps it up. Mr. Hynson also gives the following formula for

Essence of Pepsin, Suggested by Prof. Scoville, which has some resemblance to the leading brands and contains about the same proportion of alcohol that they yield by analysis:

Pepsin, 22.5 Gm.; rennin, 16.4 Gm.; lactic acid, 2 Cc.; tinct. fresh orange peel, 10 Cc.; sugar, 35 Gm.; glycerin, 125 Cc.; white wine, 350 Cc.; alcohol, 50 Cc.; water, q. s. to make 1000 Cc. (The lighter wines, as Muscatel, Tokay, Catawba or Angelica make better preparations than Sherry.)

Thirdly, It is earnestly advised that the following formulas be omitted from the revised edition of the Formulary:

No. 12. *Balsamum Traumaticum*.—Because the U. S. P. compound tincture of benzoin is generally used instead and answers every purpose.

No. 14. *Boroglycerinum*.—Is unnecessary and unused.

No. 17. *Carbasus Carbolata* and

No. 18. *Carbasus Iodoformata*, because the directions for their preparation are not creditable, and yield imperfect preparations.

No. 20. *Ceratum Extracti Cantharidis* is so unsatisfactory in effect that it should be lost.

No. 124-4. *Quillaja Emulsion of Cod-Liver Oil*, because of the toxic properties of quillaja.

No. 216. *Liquor Coccineus*.—Totally unnecessary with 215, 481 and 419 at hand, and troublesome to prepare.

No. 426. *Tinctura Vanillini Composita*, affords a discreditable, *fictitious* product, the use of which should not be encouraged by the Association.

Fourthly.—Touching the (1903) report of the Sub-Committee on Additions and referring to the

Definitions of Dosage Forms, Mr. Hynson suggests that these be made to read as follows:

Pulveres in Chartulis—Powders in Papers.—Powders or triturations accurately divided in doses and enwrapped in paper. If deliquescent or *volatile*, parchment or *paraffin* paper should be used and the powders dispensed in well stoppered vials.

Capsula Amylacea—Starch Capsules, Cachets or Wafers.—Powders, triturations or masses accurately divided and inclosed in capsules or wafers, prepared from starch-paste, pressed into concentric forms and dried. *The forms to be very carefully sealed or cemented together.*

Capsula Gelatina—Gelatin Capsules.—Powders, triturations, masses and non-aqueous liquids accurately divided and filled into capsules of gelatin. *For liquids*, these may be prepared as follows: The caps are placed on filter paper saturated with water, for a few minutes. The liquid, or semi-liquid, is introduced, by means of a pipette, into the shell of the capsules, care being taken that no portion of the liquid touches the exterior of the shell. The cap is now put on and the capsule kept in an upright position for a few minutes, when a perfect hermetic seal is secured.

Capsula Melles.—Soft gelatin capsules filled with non-aqueous liquids and sealed with melted gelatin-mass.

Tabletta Orales—Tablet Triturates—Tablettæ Hypodermicæ—Hypodermic Tablets.—Omit, if better descriptions cannot be given.

Cocœ—Chocolates.—Mixtures of medicinal substances with cocoa powder and sugar, flavored, and divided into forms weighing from 0.3 to 1 Gm.

PILL FORMS.

Gelatin Coating.—The pills, freed from dusting powder, may be dipped in a warm solution of gelatin, the excess removed and allowed to dry.

Tolu Coating.—Use compound tincture of tolu, new formula, by Dunning, method given in paper read at 1904 meeting of Md. Pharm. Association.

Silver Coating.—Dunning method.

Salol Coating.—Dunning method.

In this connection, Mr. Hynson suggests that formulas for

Campho-Menthol, and for

Compound Tincture of Tolu (for pill coating) be given in the new Formulary, the latter to be made by dissolving 5 Gm. of balsam of tolu in 20 Gm. of alcohol by the aid of gentle heat, filtering, and adding 5 Gm. of ether.

Fifthly. Mr. Hynson strongly opposes the admission of formulas for products in-

tended as imitations of popular proprietaries so long as such imitations are not generally made by the leading manufacturing pharmacists.

Under date of Aug. 11, 1904, C. S. N. Hallberg reports to me the following comments and recommendations on the above report of Mr. Hynson, and other subjects:

Agree with Mr. Hynson that the following formulas should be dropped.

No. 12. *Balsamum Traumaticum*.

No. 14. *Boroglycerinum*.

No. 216. *Liquor Coccineus*.

No. 233. *Liquor Pepsini* (U. S. P. 1880).

Names the following formulas as necessary to be dropped because of (presumable) admission into the U. S. P. 1900.

No. 10. *Aqua Hamamelidis Spirituosa*.

No. 129. *Emulsio Olei Morrhuae cum Hypophosphite*.

No. 133. *Emulsio Terebinthina Fortior*.

Agrees with Mr. Hynson's comments on the following formulas:

No. 37. *Elixir Bismuthi*.

No. 52. *Elixir Cinchona, Ferri et Bismuthi*.

No. 49. *Elixir Cinchona et Hypophosphitum*.

No. 54. *Elixir Cinchona, Ferri et Pepsini*.

No. 107. *Elixir Sodii Hypophosphitis*.

No. 264. *Mistura Copaibe Composita*, I. Lafayette mixture.

No. 385. *Syrupus Phosphatum Compositus*.

No. 386. *Syrupus Pini Strobi Compositus*.

Recommends that in the general formula—

No. 123. *Emulsiones*, dextrin and quillaja be dropped as emulsifying agents, which carries with it formulas—

No. 124-3. *Dextrin-Emulsion of Cod-liver Oil*, and

No. 124-4. *Quillaja Emulsion of Cod-liver Oil*; and that the directions to formula

No. 128. *Emulsio Olei Morrhuae cum Extracto Malti* should read: "to the malt extract gradually add an equal volume of cod-liver oil, incorporating each addition thoroughly."

Would like to submit formulas that may be more satisfactory for

No. 17. *Carbasus Carbolata*, and

No. 18. *Carbasus Iodoformata*, if these are not admitted into the U. S. P., 1900.

Can see no reason why citric acid should not be added to

No. 106. *Elixir Sodii Bromidi*, nor does he see any objection to the use of

No. 426. *Tinctura Vanillini Composita*, if used under its right name.

Proposes the following improved formula for

No. 261. *Mistura Chlorali et Potassii Bromidi Composita*:

Chloral 200 Gm.

Potassium bromide 200 Gm.

Dissolve these in

Water, hot 600 Cc.

Take

Extract of Indian cannabis 2 Gm.

Extract of hyoscyamus 2 Gm.

Pumice stone, in powder 20 Gm.

Rub the extracts in a mortar with the powdered pumice, gradually adding until thoroughly mixed; gradually add the solution of the chloral and bromide with constant trituration, and let the mixture stand 24 hours; then filter, adding enough water through the filter to make 1000 Cc.

"This furnishes a pale greenish-colored permanent liquid, slightly weaker in salts than the present formula, but probably equal in strength to the trade article. The concentrated aqueous solution of chloral and KBr. completely extracts the active principles of the extracts when these are disintegrated by the pumice. Alcohol and sugar, as shown by Markoe, must be avoided, and the present quillaja mixture is a miserable makeshift."

Mr. Hallberg also proposes a

Syrupus Pini Strobi Compositus, "*Sine Morphina*." nding the syrup prepared without morphine equally satisfactory as that made by formula No. 386. "There is no need of morphine since the chloroform and HCN are sufficiently anodyne."

Concerning Mr. Hynson's suggestions on

Definitions of Dosage Forms, Mr. Hallberg says that he approves of them with the following modifications:

Gelatin Capsules.—"Masses" were purposely left out to prevent confusion. Mass must be formed into pills and then may be enclosed in capsules as noted under "gelatin coating." This distinction is regarded as very important. Regarding

Tablets, He cannot see why they should be omitted because the description is not satisfactory. "Let the description be improved; surely there is need for their admission.

Tincture of Tolu Compound, is not a good title for the preparation proposed for tolu-coating—"ethereal" would be better.

Under date of May 26th, 1904, Professor Wilbur L. Scoville communicated to me a circular letter issued by him to the members of his sub-committee which may here serve as a

Report of Sub-Committee on Construction of Formulas.—After enumerating the formulas recommended by this sub-committee in previous reports and which have been previously accepted, for the next edition of the N. F., he recommends two formulas for an *elixir of glycerophosphates*, *A* and *B*, the latter resembling a popular commercial preparation without the green dye which it contains. He also reports that he has tried the method given by Mr. Frederick E. Niece for making so-called

Oleo-Stearate of Zinc (see Proceedings, 1903, 645), that he has found it satisfactory, and that he will report a working formula for adoption at Kansas City.

New formulas have also been found desirable for *glycerinated gentian elixir* (sweeter and less bitter than the first), for *alkaline antiseptic solution*, for *petroleum emulsion*, and an alternate formula for *antiseptic solution*, which depends markedly upon the grade of material used for results. Samples of these are promised for inspection at the Kansas City meeting, their formulas being given as follows:

1. *Alkaline Antiseptic Solution*.

Potassium bicarbonate, thirty-two grammes	32	Gm.
Sodium benzoate, thirty-two grammes	32	Gm.
Borax, eight grammes	8	Gm.
Thymol, two-tenth gramme	0.2	Gm.
Eucalyptol, two-tenth cubic centimeters	0.2	Cc.
Oil of peppermint, two-tenth cubic centimeter	0.2	Cc.
Oil of wintergreen, four-tenth cubic centimeter	0.4	Cc.
Tincture of cudbear, fifteen cubic centimeters	15	Cc.
Alcohol, sixty cubic centimeters	60	Cc.
Glycerin, two hundred and fifty cubic centimeters	250	Cc.
Water, a sufficient quantity,		

To make one thousand cubic centimeters 1000 Cc.

Dissolve the potassium carbonate, sodium benzoate and borax in six hundred and fifty (650) cubic centimeters of water, and thymol, eucalyptol and oils in the alcohol. Mix the alcoholic solution with the glycerin and add the aqueous liquid, then the tinc-

ture of cudbear, and lastly enough water to make one thousand (1000) cubic centimeters. Allow to stand a few days, then filter, adding a little magnesium carbonate to the filter, if necessary, to get a brilliant filtrate.

2. *Antiseptic Solution.*

Thymol, five-tenths gramme	0.5 Gm.
Eucalyptol, five-tenths cubic centimeter	0.5 Cc.
Oil of Mitcham peppermint, one cubic centimeter	1 Cc.
Oil of wintergreen, one cubic centimeter ..	1 Cc.
Fluid extract of wild indigo, sixteen cubic centimeters	16 Cc.
Natural benzoic acid, sixteen grammes.....	16 Gm.
Boric acid, sixteen grammes.....	16 Gm.
Talcum, ten grammes	10 Gm.
Alcohol, three hundred and seventy-five cubic centimeters...	375 Cc.
Water, six hundred and twenty-five cubic centimeters.....	625 Cc.

To make about one thousand cubic centimeters..... 1000 Cc.

Dissolve the thymol, eucalyptol and oils and fluid extract in the alcohol, and also the benzoic acid. Dissolve the boric acid in the water by the aid of heat, and add to the alcoholic solution. Then add the talcum, allow to stand a few hours, cool to 15° C. and filter.

3. *Elixir of Gentian Glycerinated.*

Gentian, in No. 50 powder, ten grammes.....	10 Gm.
Dandelion, in No. 50 powder, fifteen grammes.....	15 Gm.
Sugar, two hundred grammes.....	200 Gm.
Acetic ether, five cubic centimeters.....	5 Cc.
Phosphoric acid, five cubic centimeters.....	5 Cc.
Tincture of fresh orange peel, fifteen cubic centimeters.....	15 Cc.
Compound tincture of cardamom, sixty cubic centimeters.....	60 Cc.
Solution of saccharin, thirty cubic centimeters.....	30 Cc.
Glycerin, four hundred cubic centimeters.....	400 Cc.
White wine, a sufficient quantity,	

To make one thousand cubic centimeters..... 1000 Cc.

Mix the drugs, sugar, tinctures, solution, acid and ether with three hundred and fifty (350) cubic centimeters of wine, and macerate during three days with frequent shaking. Then filter and pass enough wine through the filter to make six hundred cubic centimeters of filtrate. To this add the glycerin.

4. *Elixir of Glycerophosphates.*

Formula A—

Glycerophosphate of sodium (75 per cent.) twenty-three and three-tenth grammes.....	23.3 Gm.
Glycerophosphate of calcium, eight and seventy-five hundredth grammes.....	8.75 Gm.
Phosphoric acid, eight grammes	8 Gm.
Glycerin, three hundred cubic centimeters.....	300 Cc.
Aromatic elixir, three hundred cubic centimeters.....	300 Cc.
Distilled water, a sufficient quantity,	

To make one thousand cubic centimeters..... 1000 Cc.

Dissolve the glycerophosphates and acid in three hundred (300) cubic centimeters of

distilled water, add the glycerin and elixir, and finally enough water to make one thousand (1000) centimeters.

Formula B—

Glycerophosphate of sodium (75 per cent.), twenty-three and three-tenth grammes	23.3	Gm.
Glycerophosphate of calcium, eight and seventy-five hundredth grammes.	8.75	Gm.
Syrup, one hundred cubic centimeters	100	Cc.
Brandy, one hundred cubic centimeters	100	Cc.
White wine (Muscatel, Catawba, etc., preferred), two hundred cubic centimeters.	200	Cc.
Acetic ether, two cubic centimeters	2	Cc.
Glycerin, five hundred cubic centimeters	500	Cc.
Phosphoric acid, eight cubic centimeters	8	Cc.
Distilled water, a sufficient quantity		

To make one thousand cubic centimeters 1000 Cc.

Mix and make a solution.

5. *Petroleum Emulsion.*

Petrolatum, fifty grammes	50	Gm.
Expressed oil of almond, two hundred and fifty grammes	250	Gm.
Powdered acacia, fifty grammes	50	Gm.
Powdered tragacanth, twenty-five grammes	25	Gm.
Syrup, one hundred cubic centimeters	100	Cc.
Tincture of fresh lemon peel, fifteen cubic centimeters	15	Cc.
Water, a sufficient quantity		

To make one thousand cubic centimeters 1000 Cc.

Make an emulsion.

Under date of July 9, 1904, G. F. Eberle calls attention to the following subjects:

Soothing Ointment.—(Compound resorcin ointment) needs the addition of paraffin to make it satisfactory. The

Alkaline Antiseptic Solution made according to the proposed formula he believes to be too strong, but the thymol should be slightly increased. Regarding

Solution of Peptonate of Iron and Manganese, and the

Elixir of Saw Palmetto Compound, he concurs with Prof. Scoville, and believes that both should be retained. While the commercial

Elixirs of Terpin Hydrate with Heroin differs from our proposed formula, there appears no reason why the latter should not be the one recognized by physicians. The formulas for

Syrup of Ferric Citro-Iodide and

Wine of Beef, Iron and Cinchona he has never had any need for. The present formula for

Tinctura Antiperiodica is satisfactory, but he has no objection to the change proposed by the Sub-Committee on Correction of Formulas. He thinks it wise if

Doses Shall be Given in the Metric System, with the equivalent in the "Old System" in brackets. Being of the opinion that we can better afford to have a few superfluous formulas than to drop any that might be useful, he suggests that the

Scope of the National Formulary should be broadened so as to include a very complete list of preparations. On the same subject, but to the contrary,

Under date of March 19, 1904, Wm. Mittelbach points out the importance of a carefully-corrected revision rather than of greater volume and large increase in formulas, this being in harmony with his previously expressed protest (see report of 1902) against the admission of formulas not imperatively demanded. He says, "Let us be careful and not draw the attention of the medical world towards our work as being somewhat a treatise on substitution." "Compound formulas intended to displace some popular proprietary will be looked upon by many as a substitute, and will certainly be used as such by unscrupulous pharmacists."

Under date of March 25, 1904, Dr. H. M. Whelpley calls attention to an improvement of

Effervescent Carlsbad Salt, suggested by the experience of two practitioners of medicine of St. Louis. The improvement consists in the addition of *saccharin* in the proportion of 1:2000 to the powder, and he considers it a proper subject for investigation by this Committee.

Finally, acting under the instruction voted at a pharmaceutical meeting of the Philadelphia College of Pharmacy, Professor Henry Kraemer has communicated to this Committee a resolution, offered by Mr. Melvin W. Bamford, concerning the

Nomenclature of the Glycerophosphate Preparations, which, as adopted, is as follows:

WHEREAS, There seems to be danger that the preparations of the glycerophosphates are getting into the same state of confusion, as to strength and nomenclature, as the preparations of the hypophosphites;

Whereas, There is no apparent reason why the nomenclature and strength of the preparations of the glycerophosphates should not conform with those of the hypophosphites in the United States Pharmacopœia and National Formulary; therefore, be it

Resolved, That the assembled members of the Philadelphia College of Pharmacy use their influence towards that end, and do hereby endorse the strength and nomenclature given in the following list of those preparations which in each case correspond with the preparations of the hypophosphites in the United States Pharmacopœia and National Formulary:

Elixir Glycerophosphatum (Elixir of Glycerophosphates) 1,000 Cc., to represent:

Calcium glycerophosphate.....	45 Gm.
Potassium glycerophosphate	15 Gm
Sodium glycerophosphate	15 Gm.

Elixir Glycerophosphatum cum Ferro (Elixir of glycerophosphates with iron) 1,000 Cc., to represent:

Calcium glycerophosphate.....	25 Gm.
Potassium glycerophosphate	15 Gm.
Sodium glycerophosphate	15 Gm.
Iron glycerophosphate.....	10 Gm.

Elixir Calcii et Sodii Glycerophosphatum (Elixir of calcium and sodium glycerophosphates) 1,000 Cc., to represent:

Calcium glycerophosphate.....	35 Gm.
Sodium glycerophosphate	35 Gm.

Elixir Glycerophosphatum Compositum (Compound elixir of glycerophosphates) 1,000 Cc., to represent:

Calcium glycerophosphate	35	Gm.
Potassium glycerophosphate.....	17.5	Gm.
Sodium glycerophosphate.....	17.5	Gm.
Iron glycerophosphate.....	2.25	Gm.
Quinine glycerophosphate	1.125	Gm.
Strychnine glycerophosphate .....	.33	Gm.

In view of the desirability that a final decision shall be reached by a personal conference of the members of the Committee at this meeting, it will prove useful, at this point, to broadly recapitulate what has been done, before offering suggestions concerning the final preparation of the text for the new edition and its eventual disposition. We have in the first place the 94 articles mentioned as having been proposed under

"*Exhibit A*" in the report of 1901, the titles of which have been omitted in the present report. It may suffice to say that many of these articles appear to have been proposed haphazard. Some of them have been favorably reported for admission; others may be found among the available formulas which have not been reported by the Sub-Committee on Construction of Formulas; the remaining ones appear to have died from inanition. In the present report

"*List I*" exhibits N. F. preparations, which for one reason and another have been criticised, and for which corrections have been proposed, after careful investigation, by the Sub-Committee on Correction of Formulas. These corrections were in most instances of a trivial character, mainly intended to give greater stability, or to improve the appearance or flavor of the preparation, but, in this light, of sufficient importance to warrant the attention given them. In few instances only was a complete reconstruction of the formula considered necessary.

"*List II*" mentions the N. F. preparations which are recommended to be dropped, either because they are unnecessary, have defective formulas, or are impracticable. This list, however, does not include formulas which require elimination because of their adoption into the U. S. P., 1900, about which no official information has yet been given to this committee.

"*List III*" comprises the preparations proposed for admission into the N. F., which have been considered by the various sub-committees and individual members in the reports of 1901 to 1904 inclusive. This list includes many of the articles enumerated under "*Exhibit A*," and may be regarded as a revised list of articles that are really desirable for admission into the N. F.

"*List IV*" enumerates the various forms suitable for the dosage of medicaments, such as powders, masses, non-aqueous liquids, in capsules, etc., that should be defined in the N. F. with general methods for their preparation and dispensing.

"*List V*" embraces criticisms by individual members on preparations proposed for admission.

"*List VI*" gives the "new formulas" which have been experimented on by the Sub-Committee on Construction of Formulas, and reported favorably for the text of the revised N. F. In addition to these,

"*List VII*" shows "available formulas" for preparations, which have been favorably considered for admission, but for which no formulas have been reported by the Sub-Committee on Construction of Formulas.

It is well here also to call attention briefly to

Important Resolutions and Rules adopted at different times for the guidance of the committee in its work, as they appear in the report submitted in 1902 and 1903, and also those adopted or suggested in the present report.

A. In the Section on Practical Pharmacy and Dispensing (Report, 1902).

1. *Titles of Preparations*, should be made as terse as possible.

2. *Numbers to Denote Formulas*, shall be omitted in future editions.
3. *U. S. P. Formulas*, dropped from that work, shall be included in the N. F. as has heretofore been the practice.
4. *Color or Flavor of Preparations*, recommended not to be changed in any now in the N. F.

B. By the General Committee (see Report, 1902):

1. *Formulas Proposed for Admission* must first be discussed by all of the members of the Sub Committee on Admissions, and all opinions referred to the General Chairman.
2. *No Formula for Preparations* shall be admitted unless the call comes from physicians and surgeons for their use in the care of the sick.

C. By the General Committee (Report, 1904):

1. *Titles of Preparations*, while as short as possible, should indicate as near as practicable the constituents.
2. "*Coined*" *Names for Preparations* shall not be utilized.

D. Suggestions by individual members of the committee:

1. *Admissions*—Protests against the admission of formulas not imperatively demanded (Wm. Mittelbach, Report, 1902).
2. *The Number of Preparations* should be kept down to actual demands (Wilbur L. Scoville, Report 1902).
3. *A Complete List of Preparations* is desirable. "It is better to have a few superfluous formulas than to drop any that might be useful" (E. G. Eberle, Report, 1904).
4. *Formulas in Imitation of Proprietaries* are strongly opposed, so long as such imitations are not generally made by the leading manufacturing pharmacists (Henry P. Hynson, Report, 1904).

Believing that in the preceding review nothing has been omitted that may be necessary for a satisfactory conclusion of the work, either by personal conference at this meeting, or by correspondence, in time for the publication of a revised edition of the National Formulary before the meeting in 1905, I have the honor to submit the following suggestions and remarks:

1. Ignoring "Exhibit A" (Report, 1901), the corrections of N. F. preparations should be adopted as reported by the Sub-Committee on Corrections of Formulas and enumerated in "List I."

2. The preparations mentioned in "List III" should be voted on *seriatim* and those receiving a favorable vote recommended as additions to the N. F., provided that the Sub-Committee on Construction of Formulas can supply satisfactory formulas, either from personal experience—which is preferable—or from the literature. The criticisms "List V" should here also be taken into consideration.

3. The definitions of dosage forms ("List IV") should also be voted on *seriatim*, and then referred for final construction to a special committee, for which I would suggest the names of C. S. N. Hallberg and Henry P. Hynson, without prejudice to other members, because they appear to be the only ones who have made reports on this subject.

4. The "new formulas" given in "List VI," which have been investigated, reported and recommended by the Sub-Committee on Construction of Formulas, should be adopted as a whole.

5. The preparations mentioned in "List VII," for which it is believed that "available formulas" have been outlined in the different reports, should also be voted on *seriatim*, and those adopted referred to the Sub-Committee on Construction of Formulas, for possible construction.

6. The eliminations suggested in "List II" should be voted on *seriatim*, bearing in mind that some of these formulas have been introduced because they have been dropped

from the U. S. P. and, under rule 3, quoted under 4, must be retained. Attention may here also be called to the fact that other eliminations will become necessary, owing to the adoption into the U. S. P., 1900, of certain preparations now in the N. F.; and, under the same rule.

7. The eliminations from the U. S. P., 1890, in the U. S. P., 1900, will make the admission of such necessary in the revised edition of the National Formulary.

Presuming that all this will be accomplished without further hitch, that the text will be in shape for publication in the expected time, and that the Association, through its Council, shall have published the book, the all-important question arises,

"What Will We Do With It?" Heretofore we have treated the National Formulary like some parents are said to treat their step-children. It has come to us by the united efforts of associations of pharmacists and individuals, who foresaw in its publication under the paternal sanction of our National Association a relief from abuses that have threatened the existence of pharmacy as a profession. During its infancy it was perhaps wise that we refrained from strenuous efforts to bring the book to the notice of the medical and pharmaceutical professions, relying rather upon its intrinsic worth and its supply at a nominal advance above cost as a means of popularizing it; and it cannot be gainsaid that, in some degree, this has been successful, particularly in so far as its intrinsic merit as a work of formulas, useful in combatting the modern demand for proprietaries, is concerned. Neither has it been a failure financially; but we must not lose sight of the fact that the work of compiling, perfecting and editing the "Formulary" has been done at practically no cost to the Association; that many of our members, and persons outside of immediate membership in the Association, have freely given their time, labor and knowledge to this work without money consideration; and that, in consequence, the cost of the "Formulary" has been limited to that of the paper, composition, printing and binding.

The Association can look with pardonable pride upon the work accomplished, and the influence exerted by the National Formulary. It has not alone been accepted by leading physicians and by pharmacists throughout our land as an authority, second only to our Pharmacopoeia, but stands as the prototype of similar works prepared, and being prepared, in other countries, notably in Great Britain and in the German Empire. The fact remains, however, that inquiries have been frequently addressed to me and others, even very recently, concerning the scope of the "Formulary," the parties from whom it may be purchased, and the price; and, as regards the "Epitome," there is also a lack of general information, that has made it possible within the past year for a professor in one of the Louisville Colleges of Medicine to address another member of this Committee, residing in a distant city, with the request that he supply him with copies for distribution to his graduating class, notwithstanding the fact that my name as compiler of the little work appears on the title-page.

I submit that the time has arrived when we should have some material return for efforts so generously bestowed in the interest and for the benefit of the pharmaceutical and medical professions. To accomplish this, we must revise our methods of introducing, popularizing and distributing the work. We must adopt and resort to plain, common-sense business methods. Let us fix a price for the work which, while not excessive, will return a fair profit after making a reasonable allowance for its exploitation. Then, by judicious advertisement; by the free distribution of the "Epitome" to the members of the graduating classes of our medical colleges; by facilitating the supply of the "Formulary" through the customary channels of the book-trade; and by other proper measures that may suggest themselves to members possessing greater business-acumen than is vouchsafed to the undersigned, secure a widespread demand and adoption of the National Formulary, and, incidentally, a notable increase of our assets.

Respectfully submitted,

C. LEWIS DIEHL, *Chairman.*

LOUISVILLE, KY., August 31, 1904.

Mr. Diehl stated that Mr. Eberle had the minutes of a meeting held the evening before, which he thought should supplement the report of the Committee, and Mr. Eberle read the following :

COATES HOUSE, KANSAS CITY, *Sept.* 6TH, 1904.

The Committee on National Formulary convened at 8 o'clock p. m. with the following present: Messrs. Diehl, Caspari, Hallberg, Rapelye, Mittelbach, Hynson, Scoville, Meissner, Hemm and Eberle. On motion, E. G. Eberle was selected Secretary. The Chairman read his report, which on motion of Mr. Hallberg, and seconded by Mr. Hynson, was adopted. On motion of Mr. Hynson, and seconded by Mr. Caspari, a vote of thanks was tendered to the Chairman for his complete report. Mr. Hallberg moved, and Mr. Caspari seconded, that Council be requested to provide reasonable compensation for compiling the text of the National Formulary. On motion of Mr. Hynson, and seconded by Mr. Meissner, the Committee adjourned. E. G. EBERLE, *Secretary*.

On motion of Mr. Wilbert, it was ordered that the minutes just read be published with the report, and that a vote of thanks be extended the chairman of the committee for his efficient work.

Mr. Wilbert then moved that the report as a whole be adopted, and the motion was seconded by Mr. Wescott.

Mr. Hynson said he hoped the members would, when the report is in print, go very carefully over it, and if they found any changes that should be made, that they would communicate with the chairman by letter; that, although the work had been very systematically done under the direction of the chairman, and he thought it hardly possible that any errors should be found, nevertheless some suggestion might be made that would be of benefit.

Mr. Ebert said it was highly desirable that, in order to make the National Formulary useful to the forty thousand pharmacists in the country, alternative formulas should be used. The use of names, too scientific and extended in their character, was a mistake, as the physicians did not understand them and would not make use of them in prescribing. He thought the Formulary should be constructed on such a plan as that every druggist in the country would buy one and try to get the physicians to use it.

Mr. Beringer agreed with Mr. Ebert that simple and euphonious names should be used in the Formulary—something that the physician could remember.

Mr. Hynson said that, acting upon the first suggestion of Mr. Ebert, he would move that the Section request the Association in general session to recommend to the Committee on National Formulary that the formulas be given in both the metric and the ordinary weights and measures.

Mr. Diehl said he thought it would be better if the Section should request that the Committee on National Formulary be *instructed* to do this, since it would be easier to do then. Mr. Hynson said he would accept the amendment.

The motion as amended was then put and carried.

Mr. Beringer moved that, wherever practicable, the committee be instructed to adopt abbreviated and euphonious names for preparations that are often substitutes for proprietaries on the market.

After discussion of Mr. Beringer's motion by Messrs. Sherman, Ford, Hallberg, Diehl, Beringer, Hynson, Ebert, Hopp, Wilbert, Anderson, Eliel, Kremers, Holzhauer and Kirchgessner, the chair put the vote on the motion and it was lost by a vote of 22 to 14.

Mr. Hallberg called attention to a recent rule adopted by the Section on Pharmacology of the American Medical Association, to the effect that no medicinal article should be advertised in the Journal of the Association under a trade-mark or copyright name, unless associated with it was the proper scientific or pharmaceutical descriptive name. This resolution, he said, had failed to reach the House of Delegates, but the editor of the Journal—or the Secretary—had assured him he was going to adopt it, and he thought all the medical journals of prominence in the country would follow that example.

Mr. Diehl said if he should happen to be chairman of the new Committee on National Formulary, and some of the old committee were associated with him, he thought he could promise that the committee would make the titles as brief as possible, not, however, sacrificing the indication of the title as to what was in the preparation.

Mr. Eliel moved that the text of the National Formulary be not allowed to be used in any text-book or dispensatory without the consent of the American Pharmaceutical Association. Mr. Hynson seconded the motion. Mr. Mayo suggested that Mr. Eliel probably meant that no publisher should use the National Formulary text without making adequate compensation therefor to the Association. Mr. Eliel accepted the amendment, and said he thought that such publisher should pay into the treasury of the Association a sum equivalent to the profit that the Association would obtain by a sale of an equal number of formularies. The motion as amended was then put and carried.

The motion of Mr. Wilbert to receive the report of the Committee on National Formulary, and refer for publication, was then put and carried.

The Chair called for a report from the Committee on the Enno Sander Prize. Mr. Eliel said he had been requested by Mr. Hopp, chairman of the committee, to make a written report, but he had led such a strenuous life since coming to Kansas City that he had forgotten all about it, but said if a verbal report would be acceptable, he would be glad to make that. Leave was granted, and he said that the committee, after careful consideration, had concluded that the prize should be awarded the author of the paper on "Sapo Mollis," Mr. George M. Beringer. Mr. Wilbert, seconded by Mr. Wescott, moved to approve the report as made, and the motion prevailed.

Mr. Hynson wanted to know what was done at the Mackinac Island meeting in regard to the Enno Sander Prize, and Mr. Beringer stated that the papers presented did not show the results of original investigation, and the committee were of opinion that they were not of a character to warrant an award of the prize, and the money was returned to Mr. Sander.

The Chair said he would entertain a motion to proceed to the selection of a Prize Committee for the present session. Mr. Schlotterbeck moved to appoint a committee of three to consider the papers presented at this meeting for the Enno Sander Prize, and the motion was seconded by Mr. Gane, and carried.

The Chair appointed on the committee Mr. Leo Eliel, Mr. A. E. Ebert, Miss Amanda Stahl, of Chicago.

The Chair then called for the nomination of officers of the Section for the ensuing year, and Mr. Hynson nominated Mr. W. C. Wescott for Chairman, Mr. Wilbert seconding the nomination. Mr. Wescott expressed his thanks for the compliment, but said if the Association met at Atlantic City next year he would have his hands full, and he would have to decline. Mr. Hynson insisted on his motion, nevertheless. Mr. Hallberg nominated Mr. W. C. Kirchgessner for Secretary, and Mr. Mayo nominated Miss Amanda Stahl, of Chicago, for Associate, which motion Mr. Wilbert seconded.

The Chair called on Mr. Kirchgessner to read a paper which he had prepared upon the subject of "Developing a Prescription Business," which the gentleman presented as follows :

DEVELOPING A PRESCRIPTION BUSINESS.

BY WM. C. KIRCHGESSNER.

Why is there a cry from so many pharmacists that there is a decline in their prescription business, and some state they have none at all? Who is to blame for such a state of affairs? The pharmacists or physicians? My answer: both, and the remedy, a better understanding with each other. That there are pharmacists who do not care for a physician's trade we cannot deny, and it is this class that hurts the pharmaceutical profession. To develop a prescription business one must be educated in both commercial and professional pharmacy. He must be able to answer all questions asked him on pharmaceutical subjects, if not to furnish same as soon as possible. Be diplomatic in your dealings with the physicians. Know his likes and dislikes, what school he graduated from, and never mention the sayings of one to the other, as in no profession is there such a jealousy as exists in the medical profession.

There are two classes of physicians. The dispenser who wants it all, the prescriber who lives and lets live. To win over the dispenser to a prescriber is no easy task. As a rule they are selfish or ignorant, and dispense to hide their ignorance. Their whole object in life is like a

leech, to get all they can. They are never prominent in medical circles or the community in which they live. They never dispense infusions, decoctions, suppositories, ointments or any expensive medicines. Of the new remedies they know nothing. On the other hand, the prescriber is a big-hearted man, ready at all times to learn something, and wants to know of the progress in pharmacy. He would rather see a dozen men making a living out of his work than to deprive one of a living. Before asking a physician for his business, whether prescription work or furnishing him his supplies, get thoroughly acquainted, calling on him and leaving him prescription blanks several times before approaching him for his business. Some will enjoy a story; others are on their dignity at all times, and with this class you want to be as dignified as they are, giving them to understand that you know your business. The dispensing physician will give as his reason for not prescribing, that his prescriptions are refilled and passed from one to the other. I assure him that if he will send his prescriptions to me, I will not repeat or give copy unless ordered by him to do so. Furthermore, I will return prescriptions to him if desired. If you have private formulas that you prepare, we will buy them of you and dispense same when ordered, or if preferred we will make them for you, and we assure you that they will be kept as your private property. Always give him to understand that no percentage on his or any one's else prescription will be given, as you would only have to charge his patient more.

A conversation is usually carried on as follows: "Do you know why Dr. B. has such a large practice and such success?" He will say he knows he has a large practice and is successful, but why he don't know, unless he cures. "Well, I will tell you why. He told me that he lays his whole success to prescription writing, as he does not confine himself to what he has in his office or with him. He diagnoses a case and prescribes accordingly." Have you ever used any of the new remedies? Have you any cases that do not improve as much as you would like to have them? I have never failed to get an answer, "Yes, I have." When you get this answer never lose any time in suggesting a remedy, and one that you know he does not have in stock, asking him to prescribe same. This is the entering wedge, and assure him his prescriptions will not be repeated. After getting him started don't lag, but call on him for a few days, asking him about that case, and after that, call weekly, always suggesting and leaving something in the shape of a sample for him. When he sees you take an interest in him he will reciprocate.

Literature and clinical data of all new remedies should be kept on hand. They are furnished gratis by the large pharmaceutical and clinical houses. The prescribing physician often asks for same, as he has read of same, mislaid it or thrown it away. This puts him under obligations to you.

Sampling physicians. This should be done at regular intervals, with seasonable goods. I have found that short names, used to designate U. S. P. and N. F. preparations, take with the physician better than the official title, as, for instance, "mistura chlorida et potass bromidi." I coined the name "chlorida." I tell the physician that it is the N. F. preparation or U. S. P., whichever it happens to be. It is the short name that catches the physician. The name itself is nothing, but brings to the physician's mind a preparation that contains "chloral." No one recognizes this fact better than the secret or semi-patent men who work the physicians. Have a preparation similar to and better than the proprietary preparation, and work the physician with same. To succeed, never give up. It is trying at first, but perseverance will win. I can show you hundreds of prescriptions where the prescriber did not know our name or the N. F. name of the preparation he wanted, so would write the proprietary name and specify our make, and when telephoning a prescription will ask if I make anything similar. After getting thoroughly acquainted in this way, and the physician has confidence in you and your preparations, you will find he will use your preparations in preference to others. Then is the time to ask him if he will allow you to use your preparations when the trade or semi-patent names are called for. I have found that very few object, and those who do will give their consent in time by freely sampling, so as to show that the preparation is as good as the semi-patent. After doing this I have received such orders: "Always use your preparations unless I write 'original.'" "Use your preparations in all my prescriptions."

Refilling prescriptions. This should be discouraged as much as possible, and to accomplish same we paste on all repeats the red slip, reading: "More harm than good is often done by repeating these prescriptions, and it is well to consult your physician before refilling." This usually has

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the desired effect, namely, driving the patient back to the doctor. I never fill a prescription knowingly for a person other than the one it was prescribed for, and if it is repeated very often I always inquire so as to be sure. If for some other person, I notify the physician, and refuse to fill same even for the person it was prescribed for without the consent of the physician. Where morphine, cocaine or narcotic drugs are in a pre-

scription, I leave out same on repeats, and notify physician, so if any kick comes he will know what is the matter, and they will thank you for it. Prescriptions for venereal diseases, when desired by the physicians, are not numbered or copy given.

Prescription blanks. Every doctor wants something different. While it is well to furnish the style they want, the one that I find gives general satisfaction is in book form, pocket size, with your card on all four corners on back.

The doctor's card in the middle of blank. On front only R in one corner and the physician's name in the right-hand corner. For office work I have two blank sizes of check-book with plain paper, so carbon copies may be taken if desired. The advantage of having your name in all four corners are two-fold. First, it makes no difference how the doctor folds it, your card will show. Second, if the doctor uses it for a powder paper, your card will be there, so you cannot fail but get some thing out of it, in spite of what he may do.

DR. HENRY W. HOWARD.
Residence : 76 Jefferson Avenue.
Office : 5th Floor Pythian Temple.

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DR. HENRY W. HOWARD.

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Bacteriological and physiological work. This class of work should not be done for nothing, excepting where the physician is a good prescriber, and he will seldom ask you to do it for nothing, as he will charge his patient whatever your fee will be. Most physicians have no microscope or accessories, and are not in a position to do this class of work. A great many do not have the time. When a physician sees you can do this class of work, he has faith in you, and will send his prescription business also. Whether you can use a scope or not, you should have one, together with the different stains. Mounts made from cultures, so as to compare if in doubt. Let them know that you can test the contents of the stomach after a test meal or cases of poisoning.

Urinary analysis is another revenue producer. Be up-to-date by having everything necessary to make accurate analysis. Have at least three good works on urinary analysis. Not old books, but the last editions, as the changes in methods employed are constantly taking place.

Medical societies. Prepare and read papers before the medical societies on subjects of interest to them. The field is unlimited for this kind of work. To get an invitation to read a paper before a medical society is an easy matter. Write to the secretary that you would be pleased to prepare a paper on some subject of interest to the medical profession, as "Doctors' Mistakes," or on some new remedy. You will soon get a reply that your offer has been accepted. Resolutions that are passed by the pharmaceutical societies that are of interest to the medical profession are sent to the medical societies. As for instance, the resolutions passed at Mackinac Island in regard to the relationship that should exist between pharmacists and physicians. This was sent with a letter stating that I would be pleased to prepare a paper on the subject to be read at one of their meetings. It brought a reply at once. I have found that this kind of work does more good than sampling, and gives you a standing in the medical fraternity. Something money cannot buy.

Charging the physician. The dispenser should be charged for everything he gets. He gives you nothing. Why should you give him? The prescriber, for trifles that he may want in his case or for his personal use, never charge him, but if a prescription for a patient or office use, charge at least cost price. As most physicians have some poor patients, have an understanding that you will give same at cost if he will designate same by marking P. P., and if too poor to pay anything, mark charge. This will mean that his service was gratis, and he would be pleased to have us do the same. I have never had a physician take advantage of this privilege.

Advertising the prescription room. Blotters, paper-cutters, paper-weights, and pen-holders are very good ads. for offices, and good reminders that you are alive. But the best paying "ad." is a card two or three inches wide and six inches long, so as to fit in the pigeon-hole in the

physician's desk. These are called "Suggestive Therapeutics," and are sent at least once a month. On the cards we write prescriptions containing our preparations. We will run a few on stomach diseases, skin diseases, etc. Always something seasonable. The returns will astonish you. These are sent to the dispensing as well as the prescribing physicians. Never fail to show the doctor something that will interest him when he visits you at your store or prescription department. It shows that you are progressive.

Wrapping a prescription. Unless the package is too large, we never use a string. A sticker, diamond-shaped, is used. This not only makes a neat package, but is a seal as well, and is as cheap as twine.

Quick and accurate service is what the physician wants. To accomplish this a great deal of work can be done in advance. We all know how long a minute seems to a sick person, especially after waiting an hour, more or less, in the physician's office.

The following solutions are kept on hand: Magnesium sulphate; potassium bromide; sodium bromide; ammonium bromide; sodium salicylate, 1:2; potassium citrate; potassium acetate; potassium iodide; sodium iodide, 1:1; mercuric chloride, 1 gr., 4 Cc.; sat. sol. boric acid; capsules of salicin, A. K.; phenacetin salol; phenacetin and salol, 2 3-5 grs. each; powders the same size; pills and capsules of private formulas that are by the different physicians. Dispensing tablets of mercury, arsenic, strychnine, copper arsenite are also used. If a patient is in a hurry and will not wait, send it to him. That these methods have been successful you may judge from the fact that with a few exceptions every physician had some just or imaginary (mostly imaginary) grievance against our store. To-day we have the good will of all of them, not one refusing to let his patient come to us with their prescription work. Seventy-five per cent. of the preparations used in prescription work were bought. To-day it is the reverse. We averaged between thirty and forty prescriptions a day. To-day over one hundred. The first six months of this year we put up 20,502 prescriptions. At first I called on physicians every Friday. Lately have been too busy to call on them; have not called for over eight months.

The Chair complimented the paper and invited full discussion.

Mr. Hallberg congratulated Mr. Kirchgessner on the form in which he had presented his paper, saying it was a happy combination of practical and ethical pharmacy. He believed that there were hundreds of pharmacists throughout the country who could do as well. Mr. Hallberg then proceeded to outline the rules and regulations by which a pharmacist might become a member of the Section on Pharmacology of the American Medical Association, pointing out that endorsement by his local medical society was necessary.

Mr. Beringer dissented from the writer's views as to refilling prescriptions containing morphine or cocaine, and said he thought the physician should always be consulted first; that he didn't think the pharmacist had a right to modify a physician's directions in the least, without his authority upon consultation. Mr. Kirchgessner explained that he would call them up, and oftentimes they would tell him to use his own judgment in the matter.

Mr. Eliel commended the paper, and said that quite a number of the suggestions made in connection with the development of a prescription business were in accord with methods he had pursued in his business. He said his label, where morphine and cocaine were used, went further than the label of Mr. Kirchgessner, as it read that the prescription would not be refilled without the physician's order, as there might be injurious consequences.

On motion of Mr. Wilbert the Section then adjourned.

SECOND SESSION—FRIDAY AFTERNOON, SEPTEMBER 9, 1904.

Chairman Burke called the Section to order at 3 p. m. in the banquet-room of the hotel.

The reading of the minutes of the first session was dispensed with, and Mr. W. C. Kirchgessner was called on to present a paper he had prepared on Carica-Papaya, and the gentleman read the following:

"ELIXIR OF CARICA-PAPAYA."

(Paw-Paw Juice.)

WM. C. KIRCHGESSNER.

Trade names: Papain, papoid, cariod, caripeptic, carapay, digeistos, papayaton. The juice in its natural state is neutral or slightly alkaline. Experiments were conducted so as to obtain the juice in a palatable and as near a natural solution as possible, with the result of the following formula:

Solution of potassa, U. S. P.	5.5 Cc.
Alcohol	120 Cc.
Simple syrup.	120 Cc.
Papain.....	17.0 Cc.
Comp. spirit of orange	6 Cc.
Water	240 Cc.

1. Mix the alcohol, spirit and syrup.
2. Dissolve the juice in the water, hot (not boiling), to which the solution of potassa has been added. When cool mix with the other solution.

The digestive properties of the elixir were tested in the following

manner: 2.0 each of hard-boiled egg, cheese, roast beef, roast pork, veal loaf, roast veal, bologna, liver sausage, tongue, corn beef, boiled ham were placed in a test-tube, to which had been added 4 Cc. elixir and 28 Cc. water and warmed to 90° F., gently agitating every fifteen minutes. At the end of one and one-half hours the whole was digested (liquefied). Experiments were conducted up to 1:2000, that is, 1 gr. paw-paw juice digested 2000 grs. mixed food. It is active in acid, alkaline or neutral solution.

Clinical experiments were next conducted.

No. 1. Woman had been doctoring for four years with different physicians. Felt distressed after each meal. Had taken lactopeptine, taka-diastase, gentian, bismuth, in fact all the different dyspeptic mixtures on the market. Dieted and had stomach washed daily, with some relief but no cure. Commenced taking 4 Cc. elixir before and after each meal. At the end of one week commenced to feel better. At end of second week could eat anything without being distressed. Continued taking elixir for four weeks, after which she said she never felt better in her life, and gained in flesh.

No. 2. Woman could not eat starchy food. By taking elixir before meals could eat all kinds of food.

No. 3. Woman troubled with vomiting in pregnancy. Had taken bismuth, cerium oxalate, ingluvin, lactopeptine without effect. 4 Cc. elixir stopped it at once.

Samples were given to ten physicians to try on the most obstinate cases they had. All reported that it was the best digestive they ever used, and gave relief when other digestants failed.

Conclusion. That it is superior to pepsin in that it is active in alkaline solutions. That it is superior to pancreatin in that it is active in acid mixtures.

Mr. Mittelbach asked if this was the juice of the paw-paw as found in this country. Mr. Kirchgessner said this particular product came from the West Indies, and could be obtained on the New York market at the present time.

The Chair stated that, without objection, the paper would be received and referred for publication, and called on Mr. Wilbert for a paper he had prepared on the subject of a new prescription file. Mr. Wilbert distributed some cuts of his device and explained its practical working. The text of his paper here follows:

A NEW PRESCRIPTION FILE.

BY M. I. WILBERT.

The most desirable method of filing prescriptions is so largely a matter of personal opinion that I feel justified in bringing to your attention a device that we have had in use for several years, and that appears to have some novel and practical features to recommend it.

The essential features of this device consist of what is practically the front and bottom of a drawer reinforced at the joint by means of a block of wood that also answers as a hinge for the double-wire support or file proper. This file is made of a heavy piece of spring wire that is bent so as to form two guides or supports for holding the prescriptions in place.

This wire is hinged at the closed end in the wooden block, fastened to the front of the drawer, and at the open or free ends is bent over, and the ends are securely held or locked by means of a strip of metal fastened to the bottom of the box or drawer.

The prescriptions are numbered at the bottom by means of an automatic



numbering machine, and are perforated at the top by means of a suitable punch. When arranged on the double wire constituting the file they are in the best possible position to be readily looked over or referred to.

The individual files are about 40 Cm. in length, and are large enough to hold 3,000 prescriptions each.

The files or drawers are arranged in a cabinet holding 18 of these files, in three rows of six each.

As shown in the accompanying picture, each drawer is labeled on the outside with the corresponding numbers that it contains, and is suspended in the cabinet, down side up, so that the prescriptions, hanging as they do from the guides or supports, do not develop any tendency to curl or to become dog-eared.

When it is desired to refer to any particular prescription, the drawer or file containing it is removed from the cabinet and placed in the reverse

position on the top of the case. In this position the numbers are readily passed in review, and when the proper prescription has been found, the position it occupies may be marked by turning down ten or a dozen of the prescriptions immediately following. Three, four, or even more, of the prescriptions may be marked in this way, and all will readily readjust themselves again on turning the file over preparatory to replacing it in the slide intended for it in the cabinet.

While I am not willing to assert that this device will prove to be the most desirable prescription file under all conditions, I am so well pleased with the experience we have had with it that I feel that I can unhesitatingly recommend it to any one whose needs and wants are at all approximate to ours.

The Chair stated that, without objection, the paper would be received and referred for publication, and it was so ordered.

Mr. Wilbur L. Scoville was then invited to display and explain a lot of twenty-five or thirty liquid preparations made by him in strict accord with new formulas presented in the report of the Committee on National Formulary, which he did. Mr. Scoville took the samples, one by one, and explained their make-up and particular characteristics, and also what proprietaries they approximated. Speaking of listerine, for example, he referred to its characteristic odor and appearance, and expressed the belief that its peculiar qualities were to be attributed to the care in selection of materials shown by the manufacturers, who used high-priced peppermint oil and benzoic acid distilled from the gum. No druggist, even with the formula, could hope to attain such excellent results in its manufacture, because he could not hope to command the same brands of oil.

The Chair said that this exhibit was really a part of the report of the Committee on National Formulary.

Mr. Francis B. Hays thought a vote of thanks was due Mr. Scoville for his trouble in making up these preparations and bringing them such a long distance to exhibit before the Section. The chair said he felt that all must recognize the great amount of work involved in preparing an exhibit of this sort, and he thought he expressed the sense of the Section in making this acknowledgment.

The Chair called for the election of officers for the ensuing year as the next order of business. Thereupon, Mr. W. C. Wescott withdrew his name from nomination for Chairman, made at the first session, and placed in nomination Mr. Chas. A. Rapelye, of Hartford. He said that it was only after a hard pull and a great deal of persuasion that he had gotten Mr. Rapelye's consent to this arrangement, but he had finally done so and he hoped he would be elected. Mr. Beringer seconded this motion. On motion of Mr. Wilbert, nominations for Chairman were closed, and on motion of Mr. Anderson, the Secretary was directed to cast the affirmative ballot of the Section, electing Mr. Rapelye Chairman for the ensuing

year. The ballot was cast accordingly, and the chair declared Mr. Rapelye duly elected to the office of Chairman.

The Chair stated that Mr. W. C. Kirchgessner was the only nominee thus far for Secretary. Mr. Cliffe moved that the nominations for Secretary be closed, and that the Secretary cast the ballot of the Section electing Mr. Kirchgessner to this office. The motion prevailed, and the Secretary announced that he had cast the ballot as directed, whereupon the Chair declared Mr. Kirchgessner duly elected to the office of Secretary.

The Chair then stated that Miss Amanda Stahl, of Chicago, was the nominee for Associate. Miss Stahl arose in the audience and expressed her thanks for the compliment, but asked to be excused on the score that she was not able to control her own time, but Mr. Mayo said he had had the distinguished honor of naming Miss Stahl in the first place, and that neither Mr. Hynson nor himself could think of permitting her to withdraw her name—that the woman behind the counter could do as good work as the man. Thereupon, on motion of Mr. Claus, nominations for Associate were closed, and on motion of Mr. Anderson the Secretary was ordered again to cast the ballot of the Section, this time electing Miss Stahl to the place indicated. This was done, and the Chair declared her duly elected to the office of Associate.

Mr. E. H. Gane then presented the following paper, after first explaining that this container, although originally intended for cod liver oil, could be used for any similar purpose :

A CONTAINER FOR FLUIDS WHICH SPOIL ON EXPOSURE TO THE AIR.

BY E. H. GANE, NEW YORK CITY.

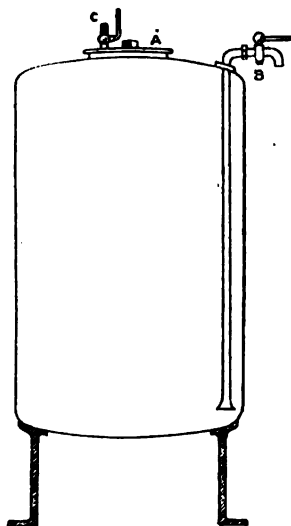
The container, which is described and illustrated herewith, was originally designed for the storage of cod-liver oil, which is one of the most difficult of all oils to keep sweet, owing to the avidity with which it absorbs oxygen from the air. The apparatus is, however, applicable to the storage of all liquids which are liable to spoil upon exposure under ordinary conditions.

Cod-liver oil, even with the most careful handling, is difficult to store, and it is rarely that the last portions removed from the container are as sweet as when the package was first opened. This is particularly the case in handling the oil in a jobbing way where a number of small packages have to be filled from day to day. To obviate this difficulty, and also to decrease the amount of handling, the writer has for some time been using a container which has given perfect satisfaction.

As will be seen from the illustration, there is nothing novel about the principle of this container. It is simply an adaptation of the principle of the ordinary wash bottle. Similar devices may be in use elsewhere, but the writer does not recall any published account thereof.

The body of the container is made of tinned copper, but heavy tin or

galvanized iron can be used equally well, provided it will stand about twenty pounds pressure. At *A* is the opening for filling, which is closed by a screw cap with rubber gasket. In the cap is inserted a stop-cock, *C*. At the right is a pipe, *B*, running almost to the bottom of the container, and terminating in a stop-cock out of which the oil is delivered. When in use the apparatus is connected at *C* by a rubber hose with a cylinder of carbonic acid gas liquefied or under pressure. Upon opening the various stop-cocks the oil is delivered at *B* in any desired quantity. In this



way contact with the air is avoided, and the last ounce is delivered in as good condition as the first. Moreover, any oil left over from season to season can be thus preserved in perfect condition, as oxidation cannot proceed in an atmosphere of carbon dioxide. This gas is now procurable so cheaply that the cost of the same is almost a negligible quantity, and is more than saved by the saving in oil that might otherwise be spoiled.

The apparatus can be made of any size to hold from an ounce up to a couple of barrels or more of oil, and the practical pharmacist with a glass bottle, a rubber cork, and a couple of glass tubes can fix up one to suit his own requirements without going to the expense of copper or other metal containers.

After two or three questions had been asked about the device by Mr. Hynson and Mr. Wilbert, on motion of Mr. Cliffe the paper was referred to take the usual course.

Mr. Scoville then presented the following paper on wax suppositories in abstract :

WAX IN SUPPOSITORIES.

BY WILBUR L. SCOVILLE.

Suppositories made with cacao butter as a vehicle, and containing more than ten per cent. of a volatile oil, or of chloral, usually need to be stiffened by the addition of wax in some form in order to dispense them at short notice. The small proportion of stearin in cacao butter makes it very susceptible to softening agents, and when such are incorporated the butter sets very slowly.

In pharmaceutical literature, wax is frequently recommended, but seldom is a discrimination made as to the variety of wax to be chosen. Since there is a wide difference in the melting-points of the waxes, and the melting-point of the suppository is its most important quality, this is a matter of much importance. It was with a view to ascertaining definitely the relative values of bees-wax and spermaceti in suppositories that the following experiments were undertaken. Paraffin wax, which is sometimes recommended, is too variable for reliable data, except for the particular specimen which might be selected. The following suppositories were made by the usual (hot) method, and at the same time tubes for taking melting-points were prepared from the same mixtures:

	1.	2.	3.	4.	5.
Chloral hydrate ..	4.00	4.00	4.00	4.00	4.00
Cacao butter.....	15.20	14.30	14.30	13.30	13.30
Spermaceti .....	....	0.90	....	1.90	....
White wax.....	....	....	0.90	....	1.90

Each mixture was for 12 rectal suppositories, containing 5 grains of chloral each and weighing 24.7 grains each. Numbers 2 and 3 contained 5 per cent of spermaceti or wax, and numbers 4 and 5 contained 10 per cent.

Number 1 was chilled in a mixture of ice and salt during half an hour at a temperature of about -15° degrees C. (5° F.), when the suppositories were firm enough to be removed from the molds, and they retained their shape under normal room conditions thereafter. This plan of using a mixture of ice and salt instead of ice alone will frequently do away with the necessity of using wax in suppositories.

The cacao butter employed melted at 30.7° C., the spermaceti at 42.6° C. and the white wax at 60.6° C. after 24 hours, i. e., the waxes and fat were allowed to set in the melting tubes for 24 hours in a cold place before the melting-points were taken.

The melting-points of the suppositories were as follows, in Centigrade degrees:

	2d day.	3d day.	4th day.	7th day.	10th day.
Plain cacao butter.....	28.2	28.0	28.0	28.7	29.8
5 per cent. spermaceti	27.1	29.6	29.2	28.3	24.8
5 per cent. white wax.....	28.3	31.3	33.8	30.5	32.4
10 per cent. spermaceti.....	27.0	27.0	27.0	28.1	29.0
10 per cent. white wax.....	43.8	44.0	41.0	41.5	42.7

The remarkable fact is shown here that mixtures of spermaceti and cacao butter with chloral melt at a lower temperature than cacao butter and chloral alone, and this, with the seeming discrepancies between the melting-points of the suppositories containing spermaceti, led to a testing of the effect of chloral on spermaceti. Suppositories and tubes were prepared consisting of equal parts of chloral hydrate and spermaceti melted together. After 24 hours these melted at 33.7° C. Since chloral melts at 58° C., and the spermaceti at 42.6° C., it is evident that these in combination tend to liquefy each other. But the suppositories were firm, congealed readily, and were easily removed from the molds.

A corresponding mixture of 50 per cent. of phenol and 50 per cent. of spermaceti melted at 28.6° C. after 24 hours, showing that phenol (m. p. 35° C. or above) acts in a similar way. Wax does not share this liquefying tendency with chloral and phenol, at least not to so marked a degree.

As a type of the oils which may be used in suppositories, oil of eucalyptus was selected. Suppositories and tubes were made as before, containing 10 per cent. of oil of eucalyptus, 10 per cent. of spermaceti or white wax, and 10 per cent. of cacao butter. After 24 hours these showed the following melting-points:

10 per cent. spermaceti	30.2° C.	and	30.2° C.
10 per cent. wax	47.8° C.	and	48.0° C.

Other suppositories were then made, containing 25 per cent. of oil of eucalyptus, 40 per cent. of spermaceti or wax, and 35 per cent. of cacao butter. After 24 hours these melted as follows:

40 per cent. spermaceti.....	37.0 C.	37.0 C.
40 per cent. white wax.....	56.2 C.	56.5 C.

There is no special liquefying action of the oil on either the spermaceti or the wax shown here more than is usually observed in the mixing of liquid and hard fats. But the lower melting-point of spermaceti makes it much safer to use, and apparently quite as effective as a hardening agent, when such is needed.

Even 10 per cent. of white wax, in either case, makes a suppository which requires several degrees of heat above that of the human body to melt it, while 40 per cent. of spermaceti just passes the limit in the case of the oil. And 40 per cent. of spermaceti is, without doubt, much more than is needed in the oil suppository to make it firm.

It has been stated that a mixture of 20 parts of spermaceti and 80 parts of cacao butter melts at about the temperature of the body. Probably variations in commercial cacao butter would modify this statement some, but it would appear that when chloral, phenols or volatile oils are present, as much as 20 per cent. of spermaceti might be used with safety.

On the other hand, more than 5 per cent. of wax would be questionable in any case. And there is no marked difference observable in the relative hardening power of the two.

From these experiments I draw the following conclusions :

1. Suppositories containing as much as 25 percent, at least, of chloral can be made with cacao butter only as a vehicle by either the hot or cold process. When made by the hot process the molds must be chilled in a mixture of ice and salt to admit of prompt dispensing.

2. Spermaceti can be used in equal proportions with chloral, phenols or volatile oils, and the suppositories can be depended upon to melt at the temperature of the body. With chloral and phenol, one-quarter to one-half as much spermaceti as of the chloral or phenol used is sufficient to admit of prompt and safe dispensing. With volatile oils an equal weight of spermaceti may be used safely.

3. White wax raises the melting-points of softer fats and oils much more than does an equal quantity of spermaceti. If used at all, it must be employed only in small proportions (less than 10 per cent. in all cases) and with caution. It sets more slowly than spermaceti, and thus is of no advantage over that body for prompt dispensing.

4. In all cases where wax is needed in suppositories, spermaceti is to be preferred, and in moderate amounts is safe.

Boston, Mass., July 1, 1904.

After a short discussion of the advantages of spermaceti over white wax and the cold method over the hot, participated in by Messrs. Hynson, Ruddiman, Eccles, Wilbert and Scoville, the paper was on motion referred for publication.

At the request of the Chair, Mr. Ruddiman then presented the following paper :

SOME DISPENSING NOTES.

BY E. A. RUDDIMAN.

SACCHARIN.

In using saccharin as a disguising agent for solutions containing alkaloidal salts, the National Formulary solution should not be used until it has been neutralized. It contains sodium bicarbonate, and is sometimes sufficiently alkaline to liberate and precipitate the alkaloid.

ZINC CHLORIDE AND IODIDE.

In dissolving a mixture of zinc chloride and zinc iodide in water a precipitate frequently results. This is due to the alkalinity of the zinc iodide. The commercial zinc iodide frequently does not all dissolve in water, and gives a solution that is distinctly alkaline to litmus. It should be carefully neutralized with dilute hydrochloric or hydriodic acid.

QUININE SULPHATE AND POTASSIUM IODIDE.

When a prescription calls for quinine sulphate with potassium iodide and a dilute acid, e. g., sulphuric, hydrochloric, citric or tartaric, a reddish compound of iodine and quinine sulphate is formed. The reaction takes place more promptly when much acid is present or when sodium arsenate is one of the ingredients. The remedy is to leave out the acid and use quinine bisulphate instead of the normal salt.

BOROSALICYLATES.

When boric and salicylic acids are used together as preservatives for aqueous solutions of alkaloidal salts, precipitation takes place under certain conditions. In no case will the salicylic acid be present in a larger proportion than one grain to the ounce of water, since that is practically a saturated solution. Boric acid will be present in a larger proportion, but the incompatibility depends chiefly upon the amount of salicylic acid. If to one fluid ounce of water containing one grain of salicylic acid and ten grains of boric acid one grain of an alkaloidal salt is added, a precipitate generally forms. If the ounce of water contains only one-half the above amounts of acid no precipitate results in case the alkaloidal salt is cocaine hydrochloride, morphine sulphate, codeine sulphate or atropine sulphate. Quinine bisulphate and strychnine sulphate give precipitates when one ounce of water contains one-fourth of a grain of salicylic acid and two and a-half grains of boric acid, but not when half that proportion of acids is present.

SYRUP OF IODIDE OF IRON WITH POTASSIUM CHLORATE.

Syrup of iodide of iron with water and potassium chlorate liberates iodine, and at least one death has been attributed to such a combination. Potassium chlorate usually has no oxidizing properties in a neutral or alkaline solution, but it does liberate iodine from syrup of iodide of iron, even though the syrup has been made neutral or slightly alkaline with ammonia or sodium bicarbonate. The excess of alkali does retard the liberation for a short time, as does a grain of potassium hypophosphite or sodium thiosulphate to the dram of syrup. A ten per cent. potassium iodide syrup with potassium chlorate does not liberate nearly as much iodine as does a ten per cent. ferrous iodide syrup.

OIL OF THEOBROMA WITH CERTAIN COMPOUNDS.

Other compounds besides chloral hydrate when rubbed with oil of theobroma soften it. Rubbing oil of theobroma with one-half its weight of camphor, euphorin, menthol, naphthalin, thymol or salol gives a soft mass or liquid. Spermaceti and wax are recommended as hardening agents, but in themselves are not sufficient, as is illustrated by the following ex-

ample: Three parts of oil of theobroma with one part of white bees-wax were melted together, allowed to cool and stand until the next day. The melting-point of this mixture was 122° F. Ten grains of this mixture were rubbed with five grains of chloral hydrate, and a mass too soft for suppositories resulted. The melting-point of this mixture was 110° F., about eleven degrees above the temperature of the body, and yet we are cautioned not to get the melting-point of a suppository mass above the temperature of the body. Probably the best solution of the problem is to use a little hardening agent with some drying powder, increasing the proportion of base to the chloral used as much as possible.

PROTARGOL.

Protargol is a little alkaline to litmus, and when mixed with aqueous solutions of some alkaloids causes precipitation. In prescribing it with cocaine hydrochloride it has been suggested to use one and a-half per cent. boric acid solution instead of water. It may be that this strength acid solution will prevent precipitation in some cases, but not in all. For instance, eight grains of protargol, four grains of cocaine hydrochloride, sixteen grains of boric acid and one ounce of water give a clear solution at first, but in a few minutes a whitish precipitate begins to form and slowly increases. The mixture was markedly acid to litmus. The next morning the mixture was of a dark blue-gray color, probably due to the reduction of the silver. The prescription was filled by using a saturated solution of boric acid, getting a clear solution. The next morning there was a slight turbidity, which increased only slightly on standing several days, although the mixture darkened in color.

POTASSIUM ACETATE WITH ELIXIR OF IRON PHOSPHATE.

When a dram of potassium acetate is added to one ounce of elixir of phosphate of iron, a whitish precipitate forms which looks like that produced when a dilute mineral acid is added to the elixir. The elixir is usually acid, and if it is first neutralized or made slightly alkaline, and then the acetate added, no precipitation follows. This holds true for potassium acetate with elixir of pyrophosphate of iron, except that precipitation may result on standing.

PHOSPHORIC ACID WITH ELIXIR OF IRON PHOSPHATE.

Phosphoric acid is not so liable to cause precipitation when the soluble phosphate of iron is dissolved in water as when it is dissolved in elixir. The soluble pyrophosphate of iron is more readily precipitated than the soluble phosphate from either water or elixir solution.

TINCTURE OF MYRRH WITH AQUEOUS SOLUTIONS.

When tincture of myrrh and pure water, in the proportion of one of

the tincture to seven of water, are mixed by adding the tincture in portions to the water, and shaking after each addition, or by adding all at once and agitating violently, the resin is thrown out of solution, but remains suspended fairly well. But if the water has a salt or other matter dissolved in it, the resin usually agglutinates to a mass or sticks to the sides of the container. Honey is the best agent to prevent this agglutination or sticking, though it does not prevent the precipitation. The amount of honey seems to depend upon the amount of aqueous solution rather than on the amount of tincture. About one dram of honey to seven drams of aqueous solution will usually prevent the trouble, and will keep the resin suspended for some time. The results are better when the honey is added to the solution rather than to the tincture.

BISMUTH SUBNITRATE.

Acacia and tragacanth have been used to suspend bismuth subnitrate in water. Neither are satisfactory. With acacia, bismuth is apt to settle to the bottom, forming a mass that can not be shaken loose. Acacia should be used sparingly, if used at all. It is rather better to rub the acacia with the bismuth and then add the water than to make a mucilage and add the bismuth, as separation does not take place quite so readily. With tragacanth the bismuth subnitrate forms a curdy precipitate which does not stick to the bottom of the bottle, but sticks to the bottle above the liquid. If glycerin or syrup is present in the prescription neither acacia nor tragacanth are necessary.

CARBOLIC ACID.

In order to cover up the odor of carbolic acid as used in antiseptic solutions various aromatics were tried. Water saturated with the aromatic, alone or diluted with distilled water, was used for dissolving the acid. The strength of the finished acid solution was 1 to 40, unless otherwise stated.

Eucalyptol water covers up the odor well, but it gives a turbidity even when diluted with three times its volume of water. If the eucalyptol water is first exposed to the air in an open vessel for fifteen or twenty hours it does not give a turbidity even when it is not diluted. Oil of eucalyptus water diluted with three volumes of water covers up the odor well and does not give a turbidity with the acid.

Thymol water disguises the odor, but gives a turbidity. When diluted with an equal volume of water no turbidity is produced, but at first the odor of the acid is perceptible, though not after standing a day or two. Menthol water gives practically the same results as thymol water.

Lavender water, with an equal volume of water, gives a clear solution, and the odor of the acid may be noticed at first, but not after standing

a time. Other aromatics, such as cumarin, camphor, turpineol and oil of peppermint, were used, but the results were not as satisfactory as those enumerated.

Oil of eucalyptus water when diluted with three volumes of water will disguise the odor of carbolic acid when it is present in the proportion of 1 to 30.

After some informal discussion of this paper by Messrs. Ebert, Diehl, Hynson, Anderson, Selzer, Wilbert, Ruddiman and others, the paper was received to take the usual course.

Mr. M. I. Wilbert was then called on to present a note on the subject of an adjustable label drawer, and the author after first handing around some leaflets containing cuts of his device, exhibited and explained the working of a small tin box with open ends and top for holding labels, the cost of which was about two cents. One advantage was, that the labels were kept perfectly flat in the drawer. His paper here follows :

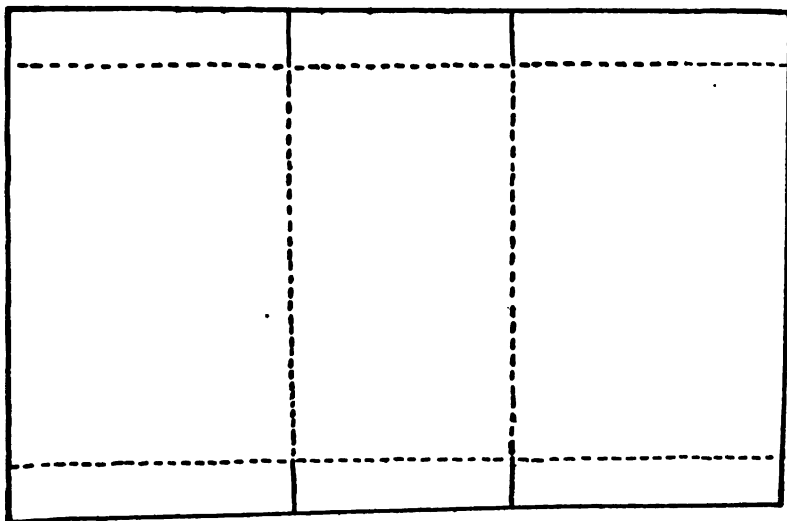
AN ADJUSTABLE LABEL DRAWER.

M. I. WILBERT,

One of the most important pieces of furniture in a pharmacy doing the ordinary drug and prescription business is a commodious and conveniently-arranged label-drawer or label-rack.

The necessary qualifications that suggest themselves are, that the drawer or rack should be large enough to hold all of the labels usually used in

FIG. 1.



the ordinary transactions of the store. It should be so arranged that any particular label can be readily found and removed, and in addition to

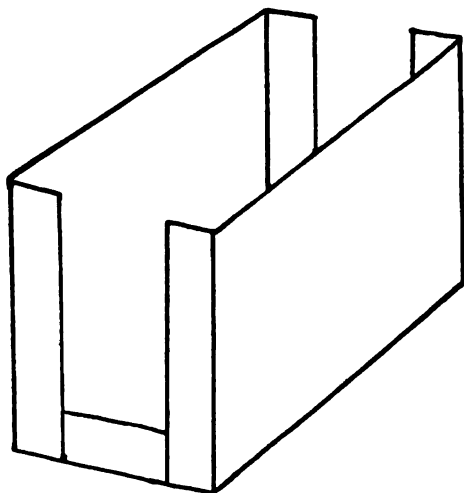
this, each section or compartment should be shut off from those adjoining in such a way as to prevent the sliding of the labels from one section to another.

This latter particularly is a point well worth remembering, as it is decidedly annoying to find labels of any one kind promiscuously distributed through half a dozen or more compartments.

Having occasion to use quite a variety of stock labels, and not being able to find a suitable method of storing them, we decided to devise one of our own that would fit in with our requirements. After experimenting with several devices, we finally decided on a system of units, consisting of tin boxes with open sides or ends, as being the most efficient as well as the most economical device for our particular purpose. The accompanying diagram illustrates one of these completed units, and also the method of making it.

Fig. 1 represents a sheet of tinned iron, or other suitable sheet metal, which is cut as indicated by the solid lines in the diagram, and then folded or bent at right angles along the dotted lines, over a suitable block or mould, to form the box as shown in Fig. 2. The size of the original piece of metal, as well as the resulting box, can, of course, be varied to suit the size of the label used. The labels used at the German Hospital, Philadelphia, are 35 by 65 mm., and our boxes are 40 mm. wide, 75

FIG. 2.



mm. long and 50 mm. high. In practice these boxes can be arranged in any desired way, either in the shallow drawers of a thread case, in trays that fit into a large drawer in or near the prescription case, in a partially reclining rack, or in the small tin drawers of a Danner herb case.

We ourselves use the latter, and have found it to answer our purpose very well. The labels are arranged in groups, and the class of preparations for which each group is intended is indicated on the outside of the drawer or drawers.

One of the evident advantages of this system of storing labels is that the units can be arranged or rearranged in any desirable way with little or no expenditure of time and with absolutely no risk of disarranging or disturbing the labels themselves. If thought desirable the units composing the drawer or rack can be fastened together or locked, either by means of a suitable strip of metal or by the use of a clamp made of spring wire that will securely hold two or more of the boxes together.

Mr. W. C. Kirchgessner, at request of the Chair, then presented the following papers :

GLYCEROLE OF HYDRIODIC ACID.

BY WM. C. KIRCHGESSNER.

The advantages of a glycerole over a syrupy base where an acid is in solution, are as follows :

- 1st. It is permanent.
- 2d. It will not caramelize.
- 3d. It will not ferment.
- 4th. It will not crystallize when cold.
- 5th. It is a better preservative.
- 6th. Neither heat nor evaporation is necessary.
- 7th. It is harmless when taken in doses as a medicinal syrup.
- 8th. Heat, cold or light does not affect it.

The following formula will make a 2 per cent. glycerole :

Potassium iodide.....	208.0 Gm. or 4000 grs.
Potassium hypophosphite	16.0 Gm. or 304 grs.
Tartaric acid	192.0 Gm. or 3696 grs.
Water.....	240 Cc. or 10 fl. ozs.
Dil. alcohol,	
Glycerin, 50 per cent., q. s.	

Dissolve the potassium salts in the water. Dissolve the acid in 400 Cc. or one pint diluted alcohol. Mix the two solutions and pack in ice for three hours, shaking bottle occasionally. Filter. Of the filtrate, 2 fluid ounces added to 14 fluid ounces 50 per cent. glycerin will make a 2 per cent. glycerole. One fluid ounce to 15 fluid ounces of 50 per cent. glycerin will make a 1 per cent. glycerole, and the filtrate itself will be a 16 per cent. solution, and can be kept as such so as to make any strength the physician may desire up to 16 per cent. The amounts given in the formula will make 11 pints of a 2 per cent. glycerole.

PULVIS VENTRICULUS CALLOSUS GALLINACEUS.

(Po. Chicken Gizzards.)

BY WM. C. KIRCHGESSNER.

This is very easily obtained, but not so easily powdered. As soon as the chicken is killed the gizzard is removed, cut open, and the lining peeled off, washed and dried. In a warm place it will dry thoroughly in one hour, when it is ready to powder. Almost any butcher will do this for you by paying him \$2 to \$3 per pound. It is said to be superior to pepsin, and is indicated in indigestion and vomiting in pregnancy.

ELIXIR OF THE GLYCEROPHOSPHATES OF LIME AND SODA.

BY WM. C. KIRCHGESSNER.

The difficulty in making this elixir is to keep the calcium glycerophosphate in solution. Experiments were made by using citric acid, combinations of citric acid and potassium citrate, citric acid and phosphoric acid, and phosphoric acid 85 per cent. and hydrochloric acid. The menstrua employed were sherry wine in different proportions with alcohol, simple elixir and prune juice. I find the one that will stay in solution and keep and make a palatable elixir is as follows:

Sodium glycerophosphate	128 gr.
Calcium glycerophosphate.....	64 gr.
Hydrochloric acid.	1 fl. dr.
Simple syrup	4 fl. ozs.
Spts. auranti co.....	1 fl. dr.
Prune juice, q. s. for fluid pint.	

Dissolve the sodium and calcium glycerophosphates in the prune juice with the hydrochloric acid previously added. Add the syrup and comp. spirit of orange and mix. Filter if necessary.

At this point, Mr. Beringer moved that it is the sense of this Section that no pharmacist should send out an article containing a label or a name that indicates its contents to be different from what it does contain. For instance, he said, to use the word "syrup," where there is only a little sugar in the preparation, is wrong. This motion was seconded by Mr. Anderson.

Mr. Ford, of Denver, entered a vigorous protest, upon the ground that nobody believes this Association approves of such a thing, and it is an insinuation that somebody does believe it.

Mr. Ryan said he wanted to know whether the Association endorsed the use of glycerole of hydriodic acid, labeling it a syrup, as some manufacturers were doing; if so, he wanted to get into the game.

Mr. Anderson thought that, now the matter had been brought up before the Section, if it failed to pass the motion, it might appear as though it approved of such practice.

A vote was then had on the motion of Mr. Beringer, and it carried without dissent.

Mr. Wilbert then presented the following paper, exhibiting a small vial containing a greenish-colored soap by way of illustration of part of his text :

SOME GREEN PREPARATIONS AND HOW TO MAKE THEM.

M. I. WILBERT.

Many of the manufacturers of proprietary preparations have long since recognized the fact that color, particularly in liquid medicaments, is frequently accepted as a guarantee of the presence of desirable active ingredients. It is for this reason that many of the elixirs, tonics, mixtures and washes that are offered to the medical profession, for their endorsement and use, are highly colored, red, yellow, brown or green, to suit the whim of the manufacturer and to suggest to the physician, or to his patient, the presence of certain active constituents or the possession of a particularly desirable physiological property.

Of the various colors that have been used from time to time, probably the most impressive, but in many respects the least available, is a bright permanent green. Practically the only form of green that is not objected to, for one reason or another, is chlorophyl. The commercial preparations of this coloring material, however, besides being comparatively expensive, are not always at hand when we have occasion to use them.

An economical source of chlorophyl, and one that does not appear to be generally known or appreciated, is hemp-seed. The seed-coat and outer hull of this seed contain a considerable amount of the green coloring matter that appears to be present in a fixed and more or less permanent quantity, and may be readily extracted with a suitable menstruum. In this connection it may be said that a sample of hemp-seed that was known to be at least six years old still gave a very satisfactory dark-green tincture with stronger alcohol.

GREEN TINCTURE.

If twenty-five parts of powdered or ground hemp-seed are macerated for a short time with an equal amount of stronger alcohol, then transferred to a percolator and extracted with the same menstruum until one hundred parts of the percolate have been obtained, they will yield a tincture that has an intensely deep-green color, and may be used as a basis for coloring alcohol, essential oils, alcoholic liquids, spirits and soap solutions.

OLEATED METHYL SALICYLATE.

Of the various proprietary preparations that are colored green, a compounded and green methyl salicylate, selling for two dollars a bottle, is

probably well known to all of you. A most satisfactory preparation of this type can readily be made by using the following formula :

Ground hemp-seed	10
Alcohol	5
Methyl salicylate, to make.	100

To the ground hemp-seed contained in a suitable vial add the alcohol, and allow to stand for ten or twelve hours, then add the methyl salicylate, shake well and allow to stand, with occasional mixing, for from four to five hours; filter and add to the dark-green filtrate enough of the methyl salicylate to make 100 parts. The resulting solution will be a clear, dark-green liquid containing a trace of fixed oil and also a small quantity of alcohol, but having the characteristic odor and taste of methyl salicylate. Like the proprietary preparation, it is well adapted as a local application in neuralgia, rheumatism, sprains, stiffness of the muscles and joints, and also as a substitute for sodium salicylate when the latter is not well borne by the stomach. Methyl salicylate colored in this way is a neat-looking, suggestive and attractive preparation, and one that would well be worth your while bringing to the attention of physicians in your respective communities.

GREEN LINIMENTS.

This same principle of coloring may, of course, be applied to a variety of liniments or other preparations intended for external use. It frequently happens that a physician wishes to give to a comparatively simple embrocation or wash a distinctive feature or suggestive color. With a great many preparations this may be readily done by macerating with, or percolating through, hemp-seed or by adding a sufficient amount of the green tincture to give to the preparation the desired shade of green color.

GREEN SOFT SOAP.

The presence of large quantities of chlorophyll in the seed-coat and pericarp of hemp-seed readily explains why it is comparatively easy to make a green soft soap from hemp-seed oil or any oleaginous solution of chlorophyll. Knowing the cause of the color, it should be easy for us to imitate the result without the use of objectionable coloring materials. At the German Hospital, Philadelphia, we have for upwards of seven years used a cold process of saponification and cotton-seed oil for making all of the various soap preparations that are used in the medical and surgical departments of that institution. Without going into any extended discussion on the advantages or the possible disadvantages of either of these factors or of the resulting product, we will repeat the formula that we use for the potash or soft soap, and then indicate to you how almost any desired shade of green may be obtained by following the same general formula.

GERMAN HOSPITAL SOFT SOAP.

Cotton-seed oil	200
Potassium hydroxide.....	45
Alcohol.....	35
Water (distilled or rain)	225

Dissolve the potassium hydroxide in 100 Cc. of the water, add the alcohol, then gradually add the cotton-seed oil, constantly stirring, until a creamy emulsion has been formed. Allow this mixture to stand for from six to eight hours, or until the mixture has become quite transparent, then incorporate the remaining portion of the water, when the soap is finished and ready for use. The resulting soap, after standing for a day or two to allow the escape of the contained air, is of a light-yellow color, odorless, and quite transparent. To obtain a light-green soap we can substitute some or all of the alcohol in the above formula with the green tincture of hemp-seed noted in the first portion of this paper.

If in addition to using the green tincture we use a dark or so-called Malaga olive oil, in place of the cotton-seed oil, the resulting soap will have a color somewhat resembling the shade of green seen in the spring of the year. A deeper shade of green may be obtained by making a solution of chlorophyl in any of the fatty oils, following practically the directions given for "Oleated Methyl Salicylate" in another portion of this paper. The shade or color of the soap obtained in this way may be varied at will from a light greenish-yellow to a dark brownish-green, according to the amount of hemp-seed or the variety or kind of oil that has been used. A clear light-yellow oil and from one to three per cent. of its weight of hemp-seed will give a very light shade of green, while a dark oil and a correspondingly larger amount of hemp-seed will give a greenish-brown or even a dead-brown soap.

It must be remembered in this connection that chlorophyl-green is one of the most delicate colors, and in addition to being evanescent at best is readily destroyed in a number of ways. The blue element of chlorophyl appears to be particularly delicate, and is readily faded out by both oxidizing as well as reducing agents. For some purposes at least it would be possible to replace the chlorophyl-blue with another pure blue coloring matter, such as indigo-carmin or one of the so-called aniline dyes, such as methylene-blue. This blue color must be used sparingly, however, and only in sufficient amount to combine with the yellow present to form the desired shade of green. In addition to the chlorophyl, or to the combination of a blue dye and the natural yellow or brown of the oil, we may also use one or the other of the prepared soap colors furnished by dealers in soap-makers' supplies. Among the various shades of green that are available, the compounds designated "green" and "olive-green" are probably the best suited for transparent soaps of this kind. These pre-

pared colors are simply dissolved in water and added, in the necessary quantities, to give the desired shade of color. I have had an opportunity of experimenting with several of these soap colors, and so far as I am able to judge from the small quantities that have been used the resulting color appears to be quite satisfactory as to stability, while in appearance they look artificial at best.

PALE GREEN ELIXIRS.

One other feature in the color line that may have caused some of you considerable thought is to be found in the pale-green elixirs that are being put on the market by several manufacturing houses. One of these that I have in mind, is marketing a slightly yellow elixir, having just a suggestion of green, that is quite pretty, if not entirely novel. A similar color effect may be obtained by adding to a yellowish elixir just a trace of blue color, preferably indigo-carmin. This will form a true green, and with the surplus of yellow will make a color that is effective and quite pretty. The accompanying samples give a very fair idea of the wide range of color that may be obtained by these various additions. As noted in the beginning of this paper, chlorophyl, if not the most satisfactory from an esthetic point of view, is by far the least objectionable in a practical way, and can, I believe, be made to meet any reasonable requirements for color in preparations for which it is at all suited.

Commenting on the paper just read, Mr. Scoville said the manufacturers were not using the old vegetable colors to any great extent, but were using the aniline dyes instead. One grain of some of these aniline dyes was sufficient to give a very pretty tint to a barrel of water, and was not enough to do any harm. He would caution against a too free use of these colors, however.

Mr. Ryan challenged the statement of Mr. Scoville as to the use of aniline dyes by the manufacturers. He said the pure food and drug laws discriminated against aniline dyes, and if the manufacturers used many of them they would find themselves shut out from doing business in a great many of the States; and they were compelled, therefore, whether they wished it or not, to use the old vegetable colors, and as a matter of fact used as few of the aniline dyes as possible.

The Chair said if there were no further remarks, the paper would be received and take the usual course.

Mr. Hynson, at request of the Chair, then read the following paper:

SOME POINTS IN DISPENSING.

BY HENRY P. HYNSON.

The writing of this paper is undertaken without the slightest hope of presenting anything new and with the positive feeling that discredit, rather

than honor, will be recompense. It is suggested by a late examination in dispensing and is offered with the wish that it may provoke discussion regarding the plain, common things of pharmacy and, also, that it may answer as something of a touch-stone for the less confident dispenser. whereby they may, to a degree at least, test their qualifications. The plan for making an examination is to select two actual prescriptions of each class, viz., powders, pills, mixtures, etc., from an active file and, without thought, make two papers from these pairs, adding two or three questions. These are then folded and a disinterested party allowed to draw one for the examination. It is surprising how nearly alike in points, such papers turn out to be and how easily the powers of a dispenser may be rated by any of them. Such an examination requires the candidate to state, in writing, exactly how he would compound and dispense the prescriptions, followed by the actual compounding of the same as described, supposedly, in his previous writing.

The examination paper, under consideration, will be given in sections with the prescription and comments following each.

"Write each of the following combinations in good prescription form, with directions as they should appear upon the labels. Describe the peculiar variety or form of article used in the prescription and fully and exactly state how it should be prepared and dispensed. As far as possible, give reasons for each step and its advantages over some other procedure that might be followed."

As appears, the first requirement is the ability to correctly write a prescription and it is, without doubt, one that is most generally lacking in candidates and, if the copies from druggists, in practice, are an indication, much more knowledge or far greater care is needed by them also. This shortcoming reflects as disastrously upon the copyist as do deficiencies in grammar and orthography. It is a defect, the enormity and prevalence of which is not well understood.

The writing of prescriptions is a matter not contemplated by this paper but the encouragement may be offered those who have little or no knowledge of Latin, that, while it will be almost impossible for them to learn to make proper endings, they may learn to correctly abbreviate and to avoid mixing bad Latin with equally bad English. To illustrate this possibility, the prescription will be written in a style that any one may easily acquire and the best comments of all the candidates used as a composite direction for preparing each prescription.

No. 1. "Prepare twelve powders, each to contain two and one-half grains of ammonium carbonate, and three-quarter grains of sugar and one-eighth of a drop of oil of peppermint. Direct them to be taken four hours apart."

B Ammon. carb. gr. iiss.
 Sacch. alb. gr. 1½.
 Ol. menth. pep. gtt. ½.
 M. ft. chart. i.
 Mitte tales. xii.

S. One powder every four hours."

"Upon a few grains of sugar, in a mortar, three drops of oil of peppermint are dropped and thoroughly triturated with it. This trituration is equally divided upon a balance; one portion is discarded and, with the other, sufficient sugar is triturated to make the whole weigh twenty-one grains. Remove this from the mortar and select a clear piece of ammonium carbonate, entirely freed from changed salt, and of this weigh off thirty grains. Powder quickly and triturate with the sugar and oil. Divide carefully into twelve equal parts and wrap each part in a piece of waxed or parchment paper of proper size, which, in turn, should be wrapped in white paper to improve the appearance and further protect. These powders should be dispensed in a very tight box or, preferably, in a well ground glass stoppered salt mouth bottle."

It may be added that these powders were in a moist, mass condition the day following their preparation. If they were not, evidently, to be dissolved before taken, the addition of a few grains of starch would be advantageous.

No. 2. "Prepare a mass composed of six grains of extract of nux vomica, sixty grains of Blaud's mass, thirty grains of quinine sulphate and divide into twenty-four pills. Direct one t. i. d.

R	Ext. Nux Vom.	gr. vi.
	Mass. (Blaud's)	3 i.
	Quin. Sulph.	gr. xxx.
	M. ft. pil.	xxiv.
S.	One 3 times a day."	

"First prepare Blaud's mass by Dunning's formula, selecting clear crystals of iron sulphate, which should be rubbed to a fine powder with the sugar and, afterwards, rubbed with the previously powdered potassium carbonate until it first becomes a soft mass, then dries. To this the powdered licorice root is added and all rubbed until again dry, when it is massed with glucose and much kneading. If powdered extract of nux vomica is used, six grains are weighed off and triturated with successive quantities of the quinine. This mixture is incorporated, small quantities at a time, with the Blaud's mass. Should it be necessary to use solid extract of nux vomica, the same should be softened with alcohol, thoroughly massed with the quinine and the two masses intimately mixed. A good mass having been formed, it should be carefully divided into twenty-four equal parts, rolled into perfectly round pills, polished with a finisher and dispensed with little or no lycopodium. If 'pipe' is not divided by machine, more accurate cutting may be done by slightly indenting the divisions on scale, before finally cutting through the mass."

No. 3. "Make twenty capsules of iron valerianate, twenty grains, and extract of sumbul, forty grains. Direct one to be taken p. c.

R	Ferri Valer.	℥ i.
	Ext. Sumbul.	℥ ii.
	M. ft. Capsul.	xx.
S.	One after meals."	

"Weigh off extract of sumbul on accurately balanced pieces of waxed paper, place in mortar and add iron valerianate, small quantities at a time. While thoroughly incorporating the two, add sufficient powdered licorice root to make a firm mass, which should be accurately divided into twenty equal parts and the parts formed into shape to fit capsule. The hands should then be carefully cleansed and the masses, by the aid of pin, placed in the capsules that will fit them best; care being taken to prevent any of this mass getting on the outside of the capsule or on edge of cap. These should be dispensed in a box, preferably with perforations, that any unavoidable odor may not be concentrated in the container."

No. 4. "Add eight minims of a one per cent. alcoholic solution of thymol to twenty grains of antipyrin, dissolved in enough water to make two fluid ounces. Direct the liquid to be used as a spray.

- R Antipyrinæ..... gr. xx.
 Liq. thymol (alc.)..... 1 p. c. ℥.viii.
 Aquæ..... q.s. ad. ℥ ii.
 M. Ft. sol.
 S. Use as a spray."

"Dissolve one grain of thymol in ninety grains of alcohol. To forty minims of this add sufficient alcohol to make two and one-half fluid drams. Of this dilution, take half a fluid dram and triturate with half dram of precipitated calcium phosphate in a mortar, with which should be mixed two fluid ounces of water; filter mixture and wash filter with enough water to make filtrate measure two fluid ounces. Dissolve antipyrine in filtrate, strain through cotton, if necessary, and dispense in perfectly clean bottle, being careful to see that the cork is wholly sound."

No. 5. Make a mixture of three scruples of powdered alum, sixty grains of potassium chlorate, half fluid ounce of tincture of myrrh, four fluid drams of honey, and sufficient water to make all measure four fluid ounces. Direct two fluid drams to be added to two fluid ounces of water, and used as mouth wash for child.

- R Pulv. alum.
 Potas. chlor.....aa 3i.
 Tinct. myrrh.
 Mellis aa..... 3iv.
 Aquæ..... q. s., ad. ℥ iv.

M. ft.

- S. For child. Add two teaspoonfuls to a wine-glass of water and use as a mouth wash."

"Finely powder potassium chlorate, and powdered alum, and dissolve in three fluid ounces of water. If any of the salts remain undissolved, allow to dissolve in mortar, pour off clear liquid and strain through cotton. Rub honey over sides and bottom of mortar, and add tincture, thoroughly mix the two, add about two fluid ounces of solution of salts, small quantities at a time, stirring constantly. Pour mixture into bottle, and rinse

mortar with balance of solution, in successive portions, and add to contents of bottle. Dispense with "Shake Well" label :

No. 6. "Make three suppositories by hand, each containing two grains of aqueous extract of opium. Supply suitable directions.

R Extract. opii gr. vi.
 Ft. suppos. iii.
 S. Insert one as directed."

"Melt ninety grains of cacao butter in capsule over water-bath, using no more heat than necessary. Soften extract upon slab, being careful not to allow any of it to dry before melted cocoa butter is added in successive portions. Mix thoroughly and work mass, allowing it to cool gradually and while mixing ; work mass well, until it becomes plastic like a good pill mass. Then roll out and divide accurately into three parts, which should be shaped into cones, all of the same form. Use as little lycopodium as possible and wipe off any adhering before dispensing."

No. 7. "Prepare one ounce of a spray solution with white petroleum oil as a base, and containing two grains of iodine and three per cent. of campho-menthol. Direct it to be used M. and E.

R Iodini gr. ii.
 Campho-menthol 3 p. c.
 Ol. petrol. alb. § i.
 M. Ft. sol.
 S. Use in atomizer morning and evening."

Weigh one fluid ounce of white petroleum oil, and ascertain what would be three per cent. of its weight. Triturate together equal parts of camphor and menthol, sufficient to equal the percentage found, and dissolve in the fluid ounce petroleum oil, less the weight of camphor and menthol, and in which oil the iodine has been dissolved, by aid of gentle heat and cooled. If solution is not perfectly free from foreign matter, it should be strained. Care should be taken not to volatilize any of the campho-menthol or iodine.

No. 8. "How much cocaine hydrochloride will be required to make two fluid ounces of a twenty per cent. solution, remembering that every one hundred grains of the salt in solution will increase the volume eighty minims. Give work."

"Finding, according to the rule given, that two hundred grains of the salt and eight hundred grains of water will make one thousand minims, or one twenty-fifth more than required, it is only necessary to deduct one twenty-fifth from each of the sums obtained to get the amounts required, which are : cocaine hydrochloride, one hundred and ninety-two grains dissolved in thirteen and one-half fluid drams of water.

$$\begin{aligned}
 200 \times .80 &= 160. & 800 + .95 &= 840. \\
 160 + 840 &= 1000 - 960 &= 40. \\
 1000 + 40 &= 25. \\
 200 + 25 &= 8. & 200 - 8 &= 192. \\
 800 + 25 &= 32. & 800 - 32 &= 768. \\
 192 + 768 &= 960.
 \end{aligned}$$

$$\begin{aligned}
 \text{Or, } 960 \times .20 &= 192. & 960 \times .80 &= 768. \\
 768 + .95 &= 808 \text{ (min.)} & \div 60 &= 13\frac{1}{2} \text{ fl. drams.}
 \end{aligned}$$

No. 9. "How would you proceed to economically prepare a fluid ounce of fifty per cent. solution of argyrol?"

"Dissolve three hundred grains of argyrol in three hundred grains of water, accurately measure the resulting solution, when by simple proportion it will be quite easy to find how much more argyrol will be required to make the fluid ounce."

No. 10. "Why should hot water not be used in preparing a mixture containing an excess of a soluble salt?"

This question was given simply to relieve and reassure the candidates and was correctly answered by every member of the class, save one.

"Soluble, or any other undissolved matter in a mixture should be in a very fine powder. If dissolved in hot water, the excess, upon the cooling of the solution, will crystallize out in an undesirable condition."

Three leading pharmacists, experienced dispensers of acknowledged ability and members of this Association, have kindly made just such comments as the students examined were expected to make, and it is most creditable to find that they have, severally, covered so many of the points that were assembled from those made by the class.

Their remarks, which will be disguised as A, B and C, are as follows:

A. "In the first prescription I would use three drops of oil of peppermint and forty-two grains of sugar, and, after triturating thoroughly, divide into two equal parts, one of which I would mix with thirty grains of ammonium carbonate, previously reduced to fine powder. The other part I would throw away or reserve for future use if I thought I would get a repeat. After mixing the ammonium carbonate with the sugar and the oil, divide into twelve equal parts, and enclose each in paraffin paper. I would select clear pieces of ammonium carbonate."

B. "Prepare this by mixing sugar with the oil, using double quantity of both, and after thorough trituration, weigh off one-half and mix the ammonium carbonate previously powdered. These powders should be dispensed in paraffin paper."

C. "Triturate two drops of the oil of peppermint with eight grains of the sugar. Of this take six grains containing one and one-half drops of the oil, the quantity needed in the whole prescription, and mix with the remainder of sugar needed fifteen grains, to make the full amount for the whole prescription. Then thoroughly mix with the ammonium carbonate, previously well powdered, and divide the whole into twelve parts, and dispense in parchment powder papers."

A. "In the second prescription, I would proceed just as I would in making Blaud's pills, using thirty-two grains of ferrous sulphate, sixteen grains of potassium carbonate,

eight grains of sugar, two of powdered tragacanth, and two of powdered marshmallow, and one drop each of glycerin and water. After the mass was well made, I would work in the quinine and the extract of nux vomica, and use glucose as an excipient. I would reduce the extract of nux vomica to a very fine powder, and mix thoroughly with the quinine, before mixing with the Blaud's pill mass."

B. "Make Blaud's mass, using Pharmacopoeia proportions; in this case I would use:

Ferrous Sulph.	40 grs.
Potass. Carb.	20 grs.
Sugar	10 grs.
Tragacanth	2.5 grs.
Althæa	2.5 grs.
Glycerin.	
Water aa q. s. to mass."	

Use one dram and incorporate the extract nux vomica and quinine sulphate previously triturated together until a good mass is formed. Then divide and roll into pills."

C. "Use powdered extract of nux vomica in fine powder. Mix thoroughly with the quinine sulphate. Then mix with the Blaud's mass until of proper consistency for rolling into pills. If not moist enough, use a few drops of simple syrup; if too moist, use a filler of some kind, such as powdered gentian root, or powdered licorice root. Then roll into twenty-four pills."

A. "The third prescription: I confess I have never worked any with extract of sumbul. I would reduce the valerianate of iron to a fine powder and mix with the extract of sumbul, using powdered licorice root to stiffen the mass if necessary. Divide into twenty equal parts and enclose each in a capsule. I imagine this would make a sticky, ill-smelling mass. I believe I would work this the same as I would asafetida. After thoroughly cleaning my hands, use a pin to pick up the divided parts and put into the capsules."

B. "I see nothing peculiar about this. The main thing is to see to it that the hands are thoroughly clean before filling in the capsules. I have no trouble in making a clean job of prescriptions of this kind. I make my mass rather solid and use a needle to insert them in the capsule, always using a capsule one size larger than necessary. I have used a perfumed powder for valerianate capsules (licorice, and vanilla or coumarin) in which I rolled the mass, before and after division."

C. "Mix iron valerianate in fine powder with the extract of sumbul and divide into twenty parts. Roll into cylindrical pieces to fit right size capsule. Place into capsules by picking up pieces with a large needle or similar instrument, to avoid getting odor and taste on the outside of capsule."

A. "In the fourth prescription, I would make a one per cent. solution of thymol in alcohol by weight and use eight minims of it."

B. "Weigh out one-half grain thymol, dissolve in fifty grains of alcohol; of the solution, use eight minims. Dissolve antipyrin in one and one-half ounces of water, and thymol solution and water q. s. to two fluid ounces. Filter."

C. "Dissolve antipyrin in about one fluid dram of the water. Then prepare a one per cent. solution of thymol by dissolving one-half grain thymol in fifty minims alcohol. Of this, take eight minims and mix with the antipyrin solution. Then add water enough to make two ounces."

A. "The fifth prescription: I would dissolve the alum and potassium chlorate in three fluid ounces of water and add to the tincture of myrrh, previously mixed with the strained honey."

B. "Prescriptions containing gum-resins, I would always use some powdered tragacanth to keep it in suspension; that is, if it is an aqueous solution. Rub tragacanth with enough water to make a smooth paste, using half a dram of powdered tragacanth. Dissolve the alum and potassium chlorate in the water, mix well with the honey and tragacanth mucilage and, lastly, add tincture of myrrh. Dispense with 'shake label.'

C. "Dissolve by agitation the two salts in water enough to make three fluid ounces. Mix this with the tincture of myrrh and honey previously well mixed and, if necessary, add to the whole enough water to make four fluid ounces. Dispense with 'shake label.'"

A. "In the sixth prescription, I would dispense rectal suppositories. I would make them of cocoa butter and by fusion. The extract of opium, I would first rub up with a few drops of water, before mixing with the cocoa butter. The dose of extract of opium seems rather large, but I do not think it is excessive."

B. "I make my suppositories in the old-fashioned mould, especially when only a small number is prescribed. I place my mould on ice, chilling it thoroughly. In the meantime, I mix my extract of opium with cocoa butter, which is grated very fine and brought just to the melting-point, before adding the extract of opium, taking care not to use any more heat than is necessary. By running the mixture into the cold mould, while barely fluid, I believe the opium is well divided."

C. "Use soft aqueous extract of opium. First mix thoroughly with fifteen grains of granulated cocoa butter to thoroughly distribute the extract. Then mix this with cocoa butter enough so that each suppository will contain fifteen grains of cocoa butter. Triturate the mixture hard and fast to convert into a plastic mass (two or three drops of olive oil will hasten the process). Quickly divide the mass into three equal parts, and form them into proper shape for rectal suppositories. If intended for vaginal suppositories, use twice as much cocoa butter and form into proper shape."

A. "In the last prescription I would figure on an ounce of four hundred and eighty grains. Campho-menthol I would take to mean equal parts of camphor and menthol, and three per cent. as three per cent. of one ounce. I would take two grains of iodine, rub it to a very fine powder in a glass mortar, add seven grains each of camphor and menthol, and triturate until the camphor and menthol become liquified and the iodine is dissolved, which it will finally do. Lastly, add white petroleum oil or liquid alboline to make four hundred and eighty grains."

B. "Weigh campho-menthol in small capsules, three per cent. being 13.5 grains; warm over water bath, and dissolve iodine in warm solution: then add petroleum oil."

C. "Campho-menthol ordered, I judge, to be equal parts of menthol and camphor, triturated until liquified. Three per cent. ordered means three per cent. of the whole prescription, or fifteen grains in round numbers. Dissolve iodine in small quantity, about one-half ounce, of white petroleum oil by trituration, and add the menthol camphor; then alboline q. s. to make one ounce. Instruct patient to use atomizer with hard rubber fittings."

While the points brought out in this paper are by no means extraordinary, they are of the kind by which a dispenser may be properly tested; they are of the kind that are constantly being overlooked by those excellent pharmacists who, having become greatly used to such requirements, fail to realize it is through and by the skill they have attained that those very important points are so easily made, that they pass unnoticed; of a kind, also, that go unrecognized by those pharmaceutical writers and editors who are constantly declaring, as they try to prove, that pharmacy

and pharmacists are still degenerating, just as was done fifty years ago. They fail to find need for pharmaceutical knowledge and technique, because the acquirement of both has become so comparatively general that their power and effects are greatly undervalued.

After some brief suggestions and remarks by Messrs. Wilbert, Anderson, Mittelbach and Lemberger, the paper was received and referred for publication.

At request of the Chair, Mr. Fisk then presented the following paper :

PILULAR VERSUS POWDERED EXTRACTS.

BY FRANK E. FISK, PH.G.

Notwithstanding the apparent abundance of our galenical *materia medica*, the dearth of concentrated preparations of vegetable substances in powder form, must be apparent to all who investigate the matter, the nearest approach to such, being our *extracta*, than which no class of preparations ever admitted into the *Pharmacopœia* were of less value or had fewer points to their credit, though thirty-three of them were admitted to the *Pharmacopœia* of 1890.

SOLID EXTRACTS.

The so-called solid extracts, constituting the above mentioned list of thirty-three, and usually classified and known among pharmacists as alcoholic, hydro-alcoholic, aqueous, acetic, glycerinated and ammoniated in accordance with the *menstruum* used, possess so *few* commendable features, and so many to condemn, that it is difficult to comprehend why they have been so long continued among the conspicuous (because of the number) classes of galenical preparations. The most commendable, if not the only redeeming feature of them as a class, being their concentration, although in not a few instances this characteristic proves otherwise, owing to the unstable and variable character of the product available, which renders uniform distribution difficult, if not impossible.

WHY THEY SHOULD BE DISCARDED OR REPLACED.

Among the objectionable features of the class may be mentioned, first, their indefinite strength as individuals, there being a decided difference in the amount of "pilular consistence" extract resulting from the same treatment of different lots of the same drug, likewise different operators with the same lot of drug, not to mention the variable quality of the product, which is usually measured by the facilities at hand, and the attention given it.

Second, the utter absence of uniformity of strength or yield of extract from the various drugs, coupled with the tendency of manufacturers to deviate from the official method or process from motives good and bad,

resulting invariably in an utter lack of uniformity of strength, color and consistence.

Third, their unstable character which adds materially to the labor and inconvenience attending their use, and increasing at the same time their cost, which is normally out of proportion to the cost of the crude material, as well as other preparations of the drug.

THE EXTRACTS AS WE FIND THEM.

A careful examination of the extract stock of one hundred pharmacies reveals the following facts, which will serve as a diagnosis of the case in question, and enable us to suggest a treatment that may eventually relieve, if not ultimately cure the existing malady. Average number of extracts in stock regardless of form or condition, thirty (30); average number bearing official titles and presumably at one time of the pilular consistence, sixteen (16); average number whose condition would admit of their "passing muster" as such, four (4); average number whose consistence was such as to indicate the absorption of atmospheric moisture and usually bearing the label, Powdered Extract, and possessing the appearance and characteristics of gum resinous exudates, such as aloes, five (5); average number bearing official names originally intended to conform to the pharmacopœial requirement of pilular consistence, having deteriorated by evaporation of the solvent, to the consistence best described by comparison to balsam tolu or Burgundy pitch at a temperature a little below their point of fusion, a consistence commonly known as "waxy," eleven (11); average number bearing the label, Powdered Extract, accompanied with the statement (same strength as the solid extract), this list includes the official powdered extracts, opium, nux vomica, krameria, etc., generally found to be in a fairly good state of preservation, ten (10).

The above analysis the author believes to be a conservative estimate of the existing condition of the list or class of galenical preparations designated by the Pharmacopœia as extracts, a condition whose deplorable character calls for a radical change in type. Yet not so radical, but that it may be easily affected without danger or confusion.

THE REMEDY FOR THE EVIL.

seems to be their replacement by a class of finely-powdered extracts bearing a uniform relation to each other as well as to the drug, being five times the strength of the drug from which prepared, and made by exhausting 500 gm. of drug of suitable degree of fineness by percolation (or circulatory displacement) with an appropriate menstruum, such as alcohol, more or less diluted, glycerinated or acidulated, as indicated by the nature of the substance in hand, reserving the first 100 Cc. of percolate, recovering the solvent from remainder of percolate by distillation on water bath, mixing residue with reserve, evaporating on water bath with carefully

regulated heat to 100 Cc., incorporating with 25 to 50 grammes desiccated milk-sugar, continuing evaporation spontaneously in cloth-covered tared capsule in moderately warm place until free from moisture, transferring the capsule and contents to scale, noting exact weight, and adding carefully dried milk-sugar sufficient to make it weigh 100 grammes, then by means of mortar and pestle reduce to fine powder and transfer to wide mouth containers and cork tightly to prevent evaporation or absorption of moisture.

POINTS IN THEIR FAVOR.

Powdered extracts thus manufactured have the advantage of a definite and uniform strength, a form that admits of their being conveniently dispensed in a variety of forms with accuracy as to dosage, since their finely divided form renders their distribution easy, whether incorporation be with an ointment or cerate or other base in ointment-making with cacao butter in suppositories, with other powdered substances in dispensing powders, cachets, tablets, triturates, capsules, dry or mass, pills or even in liquid form, in the absence of the fluid extract an equivalent 20 per cent. may often be incorporated with the vehicle specified, and a perfect solution effected.

To the class of drugs adapted to the manufacture of powdered extracts of this strength, there seems to be no particular limit, although preference should be given to the more powerful, or potent, as well as to the bitter and nauseous drugs for obvious reasons.

The following substances might be taken as a nucleus, and extended from time to time in keeping with the varied materia medica of the country, and the treatment the subject receives at the hands of the different schools of medicine: Aconite, belladonna, gentian, capsicum, cannabis indica, hyoscyamus, leptandra, euonymus, pilocarpus, colchicum root, colchicum seed, rhubarb, colocynth, lobelia seed, buchu, uva-ursi, triticum, juglans, senna, conium, valerian, viburnum prunifolium, aloes, cinchona, nux vomica, veratrum viride, opium, cascara sagrada, digitalis, etc.

In the foregoing paper, the author has endeavored to chronicle the result of his own observation with reference to a class of official preparations whose popularity with physicians has been undeserved for the very natural reason that their knowledge of them has been gleaned from text books and lectures pertaining to their characteristics in common, and, therefore, excusable, whilst the pharmacist's more intimate acquaintance with the class as individuals, has doubtless been such as to justify his support of what is here said of them, including his endorsement of the suggestions offered as a remedy.

Chicago, August 31, 1904.

On motion of Mr. Wilbert, the paper was ordered to take the usual course.

Mr. Wilbert then moved that the remainder of the papers be read by title, and referred to the Publication Committee for action.

The Chair stated that there was a paper by Mr. W. A. Dawson, of Hempstead, N. Y.; that Mr. Dawson was not a member of the Association, and in order to receive his paper a special motion would have to be made. Thereupon Mr. Anderson moved to receive and refer for publication.

Mr. Ryan thought this was a dangerous proceeding to accept the paper of a man not a member of the Association, without knowing what it contained.

After some discussion by Messrs. Anderson, Good, Mayo, Ryan and Meissner as to the proper disposition of this paper, the Chair explained that he had during the year requested through the pharmaceutical journals contributions for this Section without placing any limitation as to membership. The motion to receive and refer was then put and carried.

The Secretary then read the paper of Mr. Dawson upon Infusion of Digitalis :

SOME COMMERCIAL ASPECTS OF INFUSION OF DIGITALIS—REMARKS
UPON THE ADVERTISING VALUE OF THE OFFICIAL PREPARATIONS
OF DIGITALIS AND OTHER STANDARD GALENICALS IN SEEKING
THE BUSINESS AND GOOD-WILL OF PHYSICIANS.

BY WILLIAM A. DAWSON, HEMPSTEAD, N. Y.

To secure the trade and good-will of the physician the pharmacist has only to convince him that he is worthy his title; that he is thoroughly qualified to practice his calling, and is conscientious in his work and honorable in his dealings.

Of all the plans that I have tried, or that I have known of others making use of, the most effective way of reaching physicians for the purpose of soliciting their business and good-will, printed circular letters mailed to them at regular and frequent intervals is the most successful.

And of all things in the pharmacopœia that will secure his attention and interest at the start, infusion of digitalis stands at the top of the list.

After this one may talk of other preparations of this drug, of aconite, belladonna, hyoscyamus, tritium, scoparius, cinchona and its salts, or any of the classic remedial agents of the U. S. P.

Nearly every physician has the experience at some time in his practice of the failure to get the expected results or has gotten unexpected results from the administration of infusion of digitalis.

Where this has happened and the drug has been supplied by a dispenser whom the doctor does not know or one that he has not full confidence in, there is often a suspicion, or the question in the doctor's mind, that the medicine was at fault, rather than a condition of idiosyncrasy of the patient.

At any rate, there seems to be a feeling quite general among medical

men that this is a preparation that requires great skill and care to make it of full and proper therapeutic value and physicians, therefore, are ready and willing to give attention to anyone who may offer any information or gives practical assurance of their ability and their willingness to give the time and painstaking care that is necessary to turn out an infusion of full and uniform activity.

I recently had occasion to criticise a circular letter to physicians upon this subject. Its title was :

"A Crucial Test—Infusion of Digitalis As It Should Always Be Prepared."

The gist of this advertiser's argument was :

"That the preparation required no particular skill to make successfully ; only good material and the careful observance of the time that the leaves should be steeped, as given in the formula."

"That they dispensed a large amount of infusion of digitalis upon prescription from physicians in all parts of New York city, who were acquainted with the reliability of their preparation."

"That the full therapeutic results as described in the text-books always followed the administration of their infusion."

It also made mention of "the unfortunate degree of doubt existing among physicians regarding the reliability of this preparation as ordinarily dispensed, has tended to discourage the use of this most eligible form of digitalis to some extent."

Altogether it was an advertisement to be commended, and one that will bring "results." I may mention that this is one of a series of circular letters mailed to physicians at regular intervals ; this and similar mail advertisement has the means of building up a very large prescription business for the firm using them, and made them well known to physicians in all parts of the city ; and this in spite of the fact that the pharmacy is situated in a rather out-of-the-way locality. The greater part of high-class prescription business in New York is done by telephone. Some of the big establishments have half a dozen or more telephones installed, so great is the number of prescriptions thus received, while as many messengers are kept on the run delivering the orders.

Although this is a far-and-away better advertisement than others of its class that we have seen, it may have been made much stronger and still more convincing.

The advertiser makes a statement, a strong, well-worded statement, it is true, but it is nothing more than a statement. He adduces no evidence in proof of the correctness of the facts he thus sets forth. This is a prevalent fault among retail advertisers. It is a fault which neutralizes to a greater or less degree the trade-winning effectiveness of all advertising that is couched in this particular style.

"My word is as good as my bond ;" "I am not in the habit of lying,"

the dealer may say. True, but you are not the only advertiser. There are others whose word is as good as their bond, and neither is worth a lead nickel. The dishonest dealer will make as strong a statement and the truthfulness of his assertions will have the same face value.

But aside from this, and more important, is the fact that the statement is the least interesting and least convincing form of advertising.

For every customer secured through an advertising statement telling of the good quality of my product, two or three can be secured by telling why it is good ; not only telling how good I make it, but describing how it is made as well.

"I make my infusion from the cultivated leaves from Allen's great herb farm at Amptih'l, England. It has been cultivated there for a half century or over, and as the result of this long experience in growing it, and the selection of the best plants for replanting during so many years, the digitalis plant reaches a greater perfection of growth than in any other part of the world ; it is cut at the right moment and cured perfectly. Its cost is five times that of the ordinary digitalis of commerce, but that is of little moment, considering the fact that every lot may be relied upon to exhibit a uniform activity. It is marketed in air-tight cannisters, and consists of the leaves only—no stems, roots, dirt or insects.

"We use 'Allen's leaves' of digitalis, hyoscyamus, belladonna and conium in galenical preparations of these drugs.

"In the case of infusion of digitalis we never make up stock ahead ; every batch is made to order, and in every case we require full two hours' time for its preparation, for the water must be brought to an active boil before pouring it over the leaves, and the steeping must proceed until it is cold, without resort to artificial cooling."

When I tell a physician these things, either verbally or in printed pamphlet, it is not necessary to state that my preparation is all that a perfect infusion of digitalis could be, the testimony offered in evidence convinces him that I know how to make the preparation as it should be made, and that I use the best material procurable. The deduction is obvious that this is so, that a reputable pharmacist would hardly dare make these claims if he were not ready to substantiate them further.

That is the great point in advertising either to physician or layman : tell how you do this, why that is thus and so, where t'other differs from which.

Technical details make more interesting reading than dry statement : will be read by a larger audience ; will convince a greater proportion of readers, or, rather, they will convince themselves by their unconscious deductions from the testimony presented.

There is a vast difference in the power of an opinion formed in our mind and that of a statement made to us by another person.

The Chair explained a scheme offered by Mr. Noll for keeping a record

of filled prescriptions, and exhibited a card or chart showing the gentleman's methods. His paper on the subject here follows :

KEEPING A RECORD OF FILLED PRESCRIPTIONS.

BY M. NOLL, ATCHISON, KAN.

More than once have I been honored by our State Association with some subject pertaining to pharmacy that was considered of interest to its members, but this is my first attempt before the members of the American Pharmaceutical Association.

This particular system of keeping a record of prescriptions filled, originated with me many years ago. During all this time I have added improvements to it until now, I believe, it has become practical, useful and indispensable. I have always used it as a guide to my private prescription business, for my own purposes, but since I have become a member of the Association, I have learned not to be so selfish, but to impart a good idea to the members who might wish to derive some benefit from the same.

The time has come when the up-to-date retail druggist will have to use his per cent. column the same as the manufacturer or jobber does on his productive and non-productive sheet ; " Results is what you want to see at the expiration of days, months and years in your business."

If your apprentice, who has been working for you several months, comes and asks for a raise in his salary, you can say in a moment : " Let's see, Charlie, if I can." You will find on your column that Charlie has used the hatchet on two bottles of syrup of figs and one of elixir of lactopepsin, and knocked down the oil of peppermint bottle ; you can readily see where this boy has stood.

I have with me a sample for illustration of a month's work, which I took from my record book and also a summary of the same month, which shows in abstract form the whole month's results from a financial source. This makes a useful record for comparison for each day, month, year or years.

I have also with me the new form, which I have recently made and keep in sheets, held in a binder, which the members can examine and of which I keep extra loose sheets.

The work of keeping up this record should be done only by the head clerk of the prescription department or the proprietor, as it becomes a confidential business record of the proprietor. It would not be policy to have your doctor become familiar with the same, for the reason he might in this way discover that he is doing too much or too little for you.

I will explain how this record is entered : At the close of each day, or the first duty the following morning, the prescription file should be taken and posted from the last number recorded in your column on a memoranda sheet, you total the number of prescriptions received, together with cash amount for said number and carry them forward into the column blocked out for your doctor, which doctor is considered your regular

support to the store. You also leave one column open to what is known as "scattering" prescriptions, which must also be taken care of. This requires but a few moments each day and it gives you a check on duplicates and also gives you an accurate check on all totals in the column where they belong. Again, for convenience, I keep a tab on all refills for the month in the same manner as above, giving credit to each doctor for whom it was refilled, and at the end of the month, a grand summary of the whole month's prescription business is tabulated, as seen in my sample sheet. In this manner, you soon will have a valuable record of your prescriptions to which you can look back with some exactness.

I venture to say that very few pharmacists can tell you within one hundred (100) of how many prescriptions they have refilled, in amount and what per cent. of the prescriptions filled are refilled, or what the average price per prescription, as a rule, net.

We must admit that few pharmacists pay attention to their prescription business. My chart shows at a glance the amount of prescription work done in one prescription department and every detail pertaining to same.

Papers read by title.

BONE AND MALT.

BY LEONARD N. SELTZER, DETROIT, MICH.

The preparation which I desire to present to the Association is one which I have made for the last seven years, and is one which has found favor with my friends in the medical profession, to whom I have presented it.

The idea exemplified in this preparation, and which I keep in mind when working on a formula which I intend to introduce, is that while the formula is original, in the sense of not being suggested by, patterned after, nor intended to be substituted for, any existing preparation, the element of originality is not so pronounced that the preparation will seem strange to the doctor either in name or composition. In other words, a campaign of education is not essential to its introduction.

MIXTURE OF BONE AND MALT.

R	Powdered bone	100
	Phosphoric acid	100
	Lactic acid	160
	Pepsin	20
	Pancreatin	5
	Water q. s. ad	2000
	Malt extract	2000

Occasionally physicians prefer, *e. g.*, sodium bromide to potassium bromide, in which case 21.6 Gm. of the first may be used instead of 25 Gm. of the second, if identical bromide content is desired.

The only change in the N. F. method introduced above is the use of honey and omission of tincture of quillaja. Pure honey is a well-known adjuvant to prevent separation of resins from their alcoholic solution on dilution with water, in which function it is usually superior to glycerin, although its range is somewhat limited. For instance, it is not permissible to use it for making a syrup of tolu, since thereby the true tolu flavor is lost, although a fine-flavored syrup results.

Another advantage from omission of the tincture of quillaja is that alcohol is thus entirely omitted, ensuring absence of chloral alcoholate, which otherwise is so frequent a source of danger in this class of preparations.

For mask, syrup of tolu seems best adapted and should be given immediately before and after taking. The British mask for chloral (A. Ph. A., 48, 478 [1900]) is useless.

A study of several suggested formulæ for solution of sodium phosphate seems to indicate that the following formula (not new) is superior in taste and permanency to those containing sodium citrate, citric acid and sodium nitrate :

Sod. phosphate, crystals.....	3x.
Acid phosphoric (85 per cent.)	℥℥.
Glycerin	f℥ij.
Water q. s. (about f℥ij) ad	f℥x.

As four parts by weight of dried sodium phosphate is equivalent to 10 parts of the crystallized, the former may be used by making the indicated correction.

Method.—Gently warm the mixed liquids and triturate the salt therewith until dissolved. Best mask, as with salines generally, is carbonated water; or syrup of ginger fʒi and chloroform water fʒss may be used if desired.

LIQUOR FERRI CHLORIDI.

Observation teaches that the average druggist not being a trained chemist instinctively shrinks from operations purely chemical. That, for example, while he will readily make all the common galenicals, he invariably buys rather than makes such preparations as syrupus acidi hydriodici, syrupus ferri iodidi, etc., which involves, as he feels, too much chemistry. He has been known in the past to pay \$1.25 for syrup of calcium lactophosphates rather than make it for about one-tenth that price. In this way it is believed that many, if not most, druggists buy, rather than make, liq. ferri chloridi, with the result that tr. ferri chloridi is frequently under

strength. (A sample recently examined by the writer of a trade liq. ferri chloridi showed only 27 per cent., instead of the required 37.8 per cent.)

As ferric chloride is a common and cheap salt, and best made on a large scale, there seems no reason why an alternative formula might not be allowed by the U. S. P. I would suggest as one producing an article identical with the official in strength of salt and free acid, the following :

Ferric chloride (with water of crystallization)	62.9 Gm.
Hydrochloric acid (31.9 per cent.)	5.0 "
Water	q.s. 100.0 "

Dilute hydrochloric acid (15.95 Gm.) may be used instead of 5 Gm. of the strong, if desired.

PHARMACEUTICAL NOTES.

CONVERSION OF WEIGHTS.

Noting the frequent discussion concerning the advisability of incorporating in the pharmacopœial formulæ, together with the metric weights and measures, their equivalents in the apothecary system; and also realizing the need of the busy pharmacist in other formulæ than those of the U. S. P. for a method of ready conversion from one system to the other, I submit a method for criticism, which in my experience has proven helpful. It might be objected against any such method, as well as against the interjection of both systems into pharmacopœial formulæ, that the tables of equivalent weights and measures in the back of the pharmacopœia should suffice—an objection which ought to be valid were the tables considerably amplified.

1. To convert metric quantities to their apothecary equivalents :

$$(a) \text{ For weights } \dots\dots\dots \frac{\text{Gm.} \times 18}{70} = \text{drams.}$$

$$(b) \text{ For measures } \dots\dots\dots \frac{\text{Cc.} \times 270}{1000} = \text{fl. drams.}$$

Results thus obtained are only closely approximate, but usually near enough perhaps, since the error is negligible in the small quantities in which the more active therapeutic agents are prescribed. Thus, in (a) results are too low by only 3.8 grains for 1,000 Gm. taken; while in (b) the results are too low by 30 minims for 1,000 Cc. taken. Note: when the exact equivalent is required, it may be obtained by use of following factors of correction :

$$\text{To result obtained by (a) add } \dots\dots\dots \frac{\text{Gm.} \times 0.064}{1000} = \text{drams.}$$

$$\text{To result obtained by (b) add } \dots\dots\dots \frac{\text{Cc.}}{2000} = \text{fl. drams.}$$

But for the practical pharmacist, probably a more useful aid than the above is a method for converting metric quantities in a 1000 Cc. preparation into apothecary quantities for a two-pint preparation. The usual metric formula for 1000 Cc. preparation, converted into exact apothecary equivalents, makes a total volume of 33.8 fl. ounces, which, together with associated quantities, are awkward and inconvenient numbers, and the total volume is too large for the usual quart containers. Hence :

2. To convert metric quantities in a 1000 Cc. preparation into apothecary equivalents for a two-pint preparation :

(c) For weights in a 1000 Cc. preparation $\frac{\text{Gm.} \times 17}{70} = \text{drams (in a two-pint prep.)}$.

(d) For measures in a 1000 Cc. preparation $\frac{\text{Cc.} \times 256}{1000} = \text{fl. drams (in a two-pint prep.)}$.

Factor of correction in (c), add $\frac{\text{Gm.} \times 0.55}{1000} = \text{drams (which is equivalent to 33 grains for 1000 Gm. taken)}$. Result in (d) is exact.

To go from drams to grams, it of course suffices to reverse the above processes, *i. e.*, to invert the factor; practically, however, in (c) it is simpler to use the following: $\text{drams} \times 4 + \frac{\text{drams}}{10} + \frac{\text{drams} \times 8}{1000} = \text{Gm.}$, for a 1000 Cc. preparation. Correct, if desired, by adding to result one ten-thousandth of the result.

In practice, in (a), instead of actually multiplying Gm. by $\frac{18}{70}$, it may be simpler to use its equivalent $\frac{\text{Gm.}}{10} + \frac{\text{Gm.}}{7} + \frac{\text{Gm.}}{70}$; and in (c), instead of $\text{Gm.} \times 17$, use the equivalent $\frac{\text{Gm.}}{7} + \frac{\text{Gm.}}{70}$; and in (d), instead of $\frac{\text{Cc.} \times 270}{1000}$, use $\frac{\text{Cc.}}{4} + \frac{2 \times \text{Cc.}}{100}$, etc.

Incidentally it may be emphasized that the only thing that now upholds the apothecary system of weights and measures is that physicians learn doses in that system, and hence prescribe in it. Therefore, if the medical colleges will one day reform their instruction in this one particular, the whole cumbersome system may be abolished the morning after. The introduction of doses into the forthcoming pharmacopœia, and the recognition of 5, 10 and 15 Cc. as the respective equivalents of the teaspoon, dessert-spoon, and tablespoon (more accurate than the present recognized equivalents), will doubtless go far towards aiding the final abolition of this antiquated system.

Orono, Me.

W. F. JACKMAN.

"A SHORT CUT TO MEDICATED WATERS."

Heat in a suitable vessel any convenient quantity of distilled water, put into a suitable bottle the official quantity of calcium phosphate—drop on this the required amount of essential oil and add gradually, with shaking, the hot distilled water, and filter when cool. The agitation with hot water disintegrates the oil as fully as trituration, and saves time and labor.

Brooklyn, N. Y.

THOS. D. McELHENIE.

TINCTURE OF LARKSPUR SEED.

With an appreciation of the clemency with which the Ass. will deal with the shortcomings of the following formula, and in due approbation of the Ass.'s sense of humor, when you consider the consternation in the ranks of the Pediculus, should the formula be approved and used, I respectfully submit the following:

Larkspur seed	100 Gm.
Potassium carbonate.....	10 Gm.
Alcohol.....	500 Cc.
Water	q. s. ad. 1000 Cc.

Mix the larkspur and the potassium carbonate with 500 Cc. of water, boil the mixture for 5 minutes; when cold, add 500 Cc. of alcohol, mix and strain, pass sufficient water through the strainer to make the product measure 1000 Cc.; if not sufficiently clear, filter through paper.

This formula was originated by Mr. A. W. Firth, and has been used by us for some years, and we are led to believe that, owing to the superior quality of this preparation

over that generally manufactured, is responsible for the large sale that we have for this tincture, as you will know the usual method is to macerate the seed in alcohol for a continued period, which produces a pale, straw-colored tincture, containing but a slight percentage of the active principle delphinine, and of uncertain strength. We claim for our preparation:

1st. A complete solution of the active principle delphinine.

2d. A reduction in cost of manufacture, 50 per cent. alcohol being used instead of 95 per cent.

3d. Rapidity of production, about two hours or less being the necessary time employed.

4th. Uniformity of strength, odor and color.

The introduction of potassium carbonate may be objected to by some, but when the use of this preparation is considered, should there be any remaining in the finished product, it is reasonable to say that its cleansing action will be more beneficial than otherwise; furthermore, I believe but a slight percentage remains uncombined, owing to the partial saponification of the fixed oil present in the seed, and its subsequent elimination, in the process, with the coagulated mucilaginous matter.

New York City.

H. M. O'NEIL.

CONTRIBUTED PHARMACEUTICAL NOTES AND QUERIES.

CONTRIBUTORS.

L. E. Sayre, Lawrence, Kansas,
H. P. Hynson, Baltimore, Md.,
Otto Raubenheimer, Brooklyn, N. Y.,
W. L. Scoville, Boston, Mass.,
H. A. B. Dunning, Baltimore, Md.,
Thomas Stoddard, Buffalo, N. Y.,
H. F. Ruhl, Manheim, Pa.,
W. A. Washbury, Boston, Mass.,

John F. Patton, York, Pa.,
Thomas D. McElhenie, Brooklyn, N. Y.,
C. Osseward, Seattle, Wash.,
J. H. Schmidt, Omaha, Neb.,
C. B. Lowe, Philadelphia, Pa.,
Louis Schulze, Baltimore, Md.,
C. L. Becker, Ottawa, Kan.,
Walter H. Blome, Ann Arbor, Mich.

NOTES.

Dilute acetic acid is a good agent for removing the stain of methylene blue from the hands or utensils.

Labels will adhere to tin boxes if the boxes are coated with tincture of benzoin and let dry, before label is put on with paste.

To prevent glass stoppers from sticking fast in syrup bottles, put a little glycerin around the stopper.

An extra bottom, made of a tin top and fastened on with plaster of Paris, is a good way to prevent glycerin and castor oil bottles from keeping shelves greasy and sticky.

A pill excipient, which will work with most any combination in a mass is: powdered tragacanth, 12 parts; glycerin, 100 parts; water, 15 parts. Mix the tragacanth and glycerin, and let stand several hours before adding water.

A pill excipient, practical for most forms of pills, is composed of glucose, 5 oz.; glycerin, 1 oz.; powdered acacia, 1½ drs.; benzoic acid, 1 gr.

To make spirit of camphor: granulate the camphor or cut it into small

pieces and put into a plaited filter and dissolve by pouring on the necessary amount of alcohol.

Sawdust is handy in percolating drugs similar to cudbear. It should be freed from soluble matter by exhausting with alcohol and water, and dried. Use about the same bulk of sawdust as cudbear. The alcohol used in preparing sawdust should be recovered.

A "cracked" emulsion of cod-liver oil may be recovered by allowing it to stand and decanting the separated oil; adding this, slowly, to some fresh emulsifying agent, and then adding the balance of the "cracked" emulsion.

A quick and easy way of making paregoric is to use the correct amounts of tincture of opium and spirit of camphor, in place of powdered opium and camphor.

In making syrup of squill, the U. S. P. directs the vinegar of squill to be heated to the boiling-point and filtered. The syrup made without boiling the vinegar, does not precipitate as does the U. S. P. syrup, and apparently keeps as well.

A good many of the U. S. P. formulas seem to work not as well when used in making larger amounts as in making the amounts directed.

A quick and accurate way to estimate the strength of mercurial ointment is to place a known quantity in a tared tube of a centrifuge; place tube in water-bath until fat is liquefied, and then place in machine. Rotate until separated. This can be done in a few seconds, and the liquefied and separated fat entirely poured off. Either or both of the constituents may then be weighed.

Lime water, added to a concentrated solution of cocaine hydrochloride, will throw the alkaloid out of solution. A considerable excess of the lime solution, will, however, completely redissolve it. Excess of sodium bicarbonate will also redissolve the precipitate of cocaine it has caused.

Alcohol added to lime water causes cloudiness, which is prevented by a very small amount of creosote, if it be present in either alcohol or lime water. This cloudiness is cleared up also by the addition of creosote to the mixture.

Extract of witchhazel and extract of hydrastis suppositories may be made by fusion, without precipitation, by using a suppository base composed of

Castor oil	10 parts.
Wax	15 parts.
Cacao butter	90 parts.

This base melts readily at body temperature, and is ideal for general summer use.

A mixture of lanolin and oil is a very rapid agent for the thorough extingishment of mercury.

Benzosol is a synonym for guaiacol benzoate. .

The tendency of gelatin capsules to become soft and run together when filled with potassium iodide must not be overlooked, especially in warm, moist climates. An iodide no more alkaline than allowed by the U. S. P., and which has been thoroughly dried, will cause the same trouble. If capsules so filled are dispensed in tightly-corked vials they will be better preserved. No more than six or eight capsules should be put in a vial, thereby exposing but a few at a time.

It should be remembered that in German prescriptions, "natrium chloricum" means sodium *chlorate*, while "natrium chloratum" is sodium *chloride*.

A method for ascertaining percentage strength of small quantities of alcohol and water mixture :

If liquid contains solid matter in solution, as tinctures, etc., it should be distilled and all the volatile matter collected. 10 Cc. is placed in a 15 Cc. cylindrical graduate, and potassium citrate added as long as the upper alcoholic layer is diminished, when the amount of the upper layer is read off, this being the quantity of alcohol present in 10 Cc. of sample. The potassium citrate acts as a dehydrating agent, withdrawing the water. The resulting solution is immiscible with the alcohol.

For strongly alcoholic liquids one or two Cc. water may be added to the 10 Cc. sample liquid, so that differentiating layers of liquids may be formed.

Bromides of the alkalies precipitate dionin from solution. Like other salts of morphine so formed, it is insoluble in a solution of the bromides. Whether it is precipitated as ethyl-morphine bromide or simply as morphine hydrobromide the Scientific Section may decide. This incompatibility cost the contributor the loss of eighty cents.

Prescription weights can be kept clean and made more easily seen by putting a piece of white paper into the box in which they are kept and covering it with a piece of glass.

When hinged suppository moulds are chilled by placing them upon a block of ice, water is apt to be drawn into the moulds by capillary attraction ; unless emptied out it will spoil the shape of the suppositories. This can be prevented by placing the moulds upon a sheet of paper, which will also prevent them from slipping.

That the gelatinization of tincture of kino is due to a micro-organism, and that sterilization will prevent the same, seems proven by the fact that a sample of the tincture prepared and sterilized November 23d, 1903, is still in good condition, July 1st, whilst other samples, not sterilized, prepared at the same time show signs of gelatinization.

It is advantageous to put, in addition to the doctor's name, his address and office hours upon prescription labels.

By the use of an ordinary hard rubber vaginal syringe, a spoiled emul-

sion may generally be redeemed. Draw the mixture of oil, water and gum into the barrel and expel with some force into the remainder of the mixture in the mortar. This method may be advantageously used in the preparation of difficult emulsifiable mixtures.

A popular remedy, frequently called for during the winter months, is a mixture of tincture of benzoin, rose water and glycerin. A satisfactory preparation will result by observing the following directions: into a perfectly dry bottle put one ounce of tincture of benzoin. Then mix four fluid ounces each of glycerin and rose water, and pour this mixture in a thin, steady stream, right into the centre of the tincture of benzoin. *No agitation.* It is surprising what a handsome and permanent mixture this manipulation produces.

Phosphorus paste is a popular agent for the extermination of roaches, mice and rats, and may be successfully made as follows: One pound of wheat flour is beaten to a smooth paste with three pints of cold water, into which put two ounces of phosphorus (stick); place on the fire, stir vigorously while starch cells are breaking and until a thick paste has formed. As a preservative, use sodium chloride and mercuric chloride; glycerin may be added. Color with venetian red. The phosphorus, by this process, is thoroughly incorporated.

Tincture of iodine, by circulatory displacement, may be easily made by taking the barrel of a glass vaginal syringe, of suitable size, and fit it to a cork and wide-mouth bottle to suit. Put the alcohol in the bottle, the iodine in the tube, and, in the morning, the tincture is finished. The same idea may be applied to camphorated oil, using a number-three lamp chimney. Also, to tincture myrrh with a smaller chimney. Tincture tolu or any other tincture or solution, in which the solvent is in large excess, as to bulk of solid, may be made in the same way, for example, saturated solutions of boric acid, potassium chlorate, ammonium carbonate, etc.

Tincture of iodine is a mean thing to pour, almost always spills down the side of the vial. A small aluminum funnel, turned down over the stopper of the stock bottle and used for dispensing tincture of iodine, exclusively, answers a good purpose.

Twenty years' use of the plan for preparing solution of citrate of magnesia, suggested by Thomas D. McElhenie, seems to be the best way. Make the solution as usual. First label the bottles. Put in sixty grains of potassium bicarbonate, pour on two ounces of simple syrup, and fill the bottles slowly with the solution. The crystals remain under the syrup and dissolve very slowly. Set the bottles away and do not shake them until sold. The customer receives the solution fresh and "lively," and is pleased.

QUERIES.

How may the growth in orange-flower water be prevented?

How may Ung. Hydrarg. Oxid. Rub. be prepared so it will keep a nice red color?

What is an antidote for tincture arnica? The text-books do not say anything on this subject.

Schwammroth (German), a powder said to be good for kidney trouble?

Why does listerine (each fluid dram said to contain two grains refined and purified benzo-boracic acid) form no flesh-colored precipitate of ferric benzoate with tincture of ferric chloride? It forms a violet solution.

Why does a solution of celluloid in refined wood alcohol (or Columbian spts.) smell like bananas?

Why does a solution of sodium bromide (1 dr. in 1 oz.) in Wyeth's elixir of phos. iron, quinine and strychnia form a clear solution? Made with the N. F. elixir, containing only half as much iron phosphate and quinia as Wyeth's elixir, a bulky precipitate of quinine and strychnine bromide results.

Wanted: A practical method for dispensing guaiacol in capsules.

Will a low barometric pressure cause an explosion of peroxide of hydrogen? On May 7th a one-pound bottle of Marchand's peroxide of hydrogen exploded with a terrific force in a drug store, breaking a number of bottles and scattering fragments of glass through the store room with considerable force. The cause of the explosion in this case was supposed to be a low atmospheric pressure. An aneroid barometer that is located in the store had fallen from a mean average of 29.5 to 28.6 during the preceding 48 hours. The bottle of peroxide was on the shelf, where it had stood the past three months under the same conditions and temperature, and was undisturbed when the explosion occurred. The reduced external air pressure was assigned as the probable cause of this explosion, a similar occurrence having happened with this same brand in my store several years ago under the same conditions. While it is not an uncommon occurrence for bottles containing this chemical to explode, manufacturers of this substance should not fail to take note of the fact that a bottle may be sufficiently strong under ordinary conditions, yet the same bottle may be unsafe under unusual conditions of atmospheric pressure. They should supply either stronger bottles or larger ones that will allow for the expansion of the liberated gas.

The Chair called for new business, but none was offered.

The installation of officers was declared next in order, and the Chair appointed Mr. Hynson, the "father" of this Section, to escort the chairman-elect to the platform. Mr. Hynson conducted Mr. Rapelye forward, and introduced him as a member of the first Committee on Practical Pharmacy and Dispensing, and as one very much interested in the establishment of this Section, and said it gave him particular pleasure to see him become chairman of the Section. The Chair congratulated Mr. Rapelye upon his elevation to the chairmanship and the Section upon its selection of so capable an officer. Mr. Rapelye said he was very reluctant to accept the place in the beginning, but since it was the wish of the Section to

confer this honor on him, he would fill the position to the best of his ability.

Mr. Hynson said if the members wanted to be introduced to Miss Stahl, the new Associate on the Committee, they would have to rise and make their best bow. By a simultaneous movement the members arose and made their acknowledgments to Miss Stahl, who sat in the audience.

Mr. Mayo moved a vote of thanks to the retiring officers, even if they did want to hitch the Commercial Section on to this. The motion was carried by a unanimous rising vote.

On motion of Mr. Anderson, the Section finally adjourned

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—THURSDAY AFTERNOON, SEPTEMBER 8, 1904.

The Section was called to order by Chairman W. A. Puckner, of Chicago, at 2 : 45 p. m. in the banquet-room of the hotel.

Mr. Chas. E. Caspari of the Committee was called to the Chair while Mr. Puckner presented the report of the Committee on Scientific Papers as follows :

REPORT OF COMMITTEE ON SCIENTIFIC PAPERS.

The life and success of an association depend upon the acquisition of new members. To induce pharmacists to seek membership in the American Pharmaceutical Association must ever be one of the aims of its members. In discussing the reasons why the retail, or real, pharmacist does not more freely seek membership in our Association and participate in our meetings, it is often stated that this is largely because of the undue preponderance and prominence of "college professors and scientific fellows." Accordingly the title doctor and professor has been tabooed, and a Section of Practical Pharmacy and Dispensing has been created. And recently when an editor requested from prominent members of this Association a statement regarding the scope or program of the coming (this) annual meeting, the replies when published enlarged upon the importance of the Commercial Section, the Section of Practical Pharmacy and Dispensing, the discussion regarding the proposed National Bureau of Foods and Medicines, and so forth, without one word of mention regarding the work of this, the Section on Scientific Papers. It must, therefore, be gratifying to those who participate in the meetings of this Section to note its constant growth both as to attendance at its meetings and in the number and scientific value of the papers brought before it, until to-day the scientific work done under the auspices of the American Pharmaceutical Association compares favorably with that of any similar organization of the world.

But while the growth of the Section is gratifying, it has come about that the time allotted to it for the transaction of business has become entirely insufficient. Considering the time allotted to this Section to be six hours, and that the reports of the various committees, the nomination and election of officers, and other routine matters, take up one-third of this time, that the reading of one or two papers and its discussion, as always happens, take another third of the time, there remain but two to three hours available for the consideration of from thirty to forty original contributions, something like three

to four minutes for each, with the result that a large proportion receive no consideration whatever. While we heartily agree with the sentiment of a former Chairman of this Section, Dr. Rusby, that more benefit would be derived were a whole session devoted to the consideration of one really great paper than were a large number of minor ones taken up, we also see much truth in a remark recently overheard at the close of a meeting where a paper was read in full which consisted in an enumeration of specific gravities, melting-points, boiling-points, color tests, etc., of a large number of substances, to the effect that the time consumed for the presentation of a paper was in direct proportion to the author's self-assurance and inversely proportional to its scientific merit. Desiring to facilitate the work of the Section, and wishing to secure a fair hearing for all contributors, your Committee in soliciting papers has called attention to Chapter IX., Article IV.. of the By-Laws, which says that any paper requiring more than ten minutes for its reading must be accompanied by a synopsis which can be read in ten minutes' time, and also to the adoption by the Association of the recommendation of President Whelpley in 1902, that every paper should be accompanied by an abstract for publication in the program to be issued by the officers of the Section. Owing to the fact that the provision of the By-Laws requiring lengthy papers to be accompanied by abstracts has not been enforced, and because the recommendation requiring that an abstract be printed on the program conflicts with the By-Laws which permit the paper and abstract to be handed in any time prior to the first session, your Committee has not been entirely successful. To aid future committees in this respect it is recommended that the By-Laws be altered so that Chapter IX., Article IV., shall read: "Every paper to be presented at the annual meeting of the Association must be sent to the Chairman of the particular Section to which it refers at least thirty days prior to the meeting, accompanied by an abstract indicative of its contents, and containing not less than fifty nor more than two hundred words, which shall appear in the program to be issued under the direction of the officers of each Section. Not more than ten minutes shall be allowed for the presentation of a paper."

While Article III. of Chapter IX. directs the committee on scientific papers to report a number of questions of scientific and practical interest the answers to which may advance the interests of pharmacy, etc. your committee has not issued such a set of questions and hence has laid itself liable to censure. But, since each investigator is working along well defined lines and annually at these meetings reports the results of his labors, it seemed superfluous and even impertinent to propound such a set of queries and so we gladly followed the precedent established by past committees. Your committee does on the other hand believe in the desirability of concerted effort in attacking certain questions, as has been done by the appointment of such committees as the committee on drug market, the research committee and others, and we would suggest that at this time one or more questions be decided on to receive full discussion at the next annual meeting and that now the acceptance of a number of members be secured who then can at once apportion the work amongst themselves. We believe that in this way many mooted questions which have been discussed from year to year without definite results, could by a united, systematic and scientific investigation be settled once for all.

While with our section the tendency has been toward leaving the choice of subjects to the contributors and, in our Proceedings to print the papers that are brought before the section, many other societies are adopting a different plan; thus, but comparatively few of the contributions appearing in the Journal of the American Chemical Society are read before the stated meetings of the society; this is also true of the German Chemical Society. The latter also at times secures men eminent in certain fields of pure or applied chemistry to deliver lectures upon the advance and present state of the line of work; thus recently Professor W. Will discussed the progress in explosives since the development of organic chemistry (*Der Fortschritt der Sprengtechnik seit der Entwicklung der organ-*

ischen Chemie). This plan of having specialists present in a general way the advance made in their fields of labor has also been adopted by the Chicago Section of the American Chemical Society. The American Medical Association seems to have had such a superabundance of papers that only those of special interest are printed in the journal of the Association; the papers to be read are limited to a certain specified number and are upon subjects selected by the committee in charge of the sections. While eventually, as the membership of this association increases, we no doubt will be forced to limit both the numbers of papers to be presented at our meetings and to be printed in the Proceedings, we hope that with the provision for the printing of abstracts on the program of the section there need be no curtailment at the present time.

We, however, do believe that one or more lectures at each annual meeting, under the auspices of the scientific section upon scientific topics of pharmaceutical bearing could, if sufficiently broad and nontechnical, be made one of the features of our annual meetings and do much toward influencing the membership and attendance of the most desirable class, the young pharmacists, who though unable to contribute to this section and not in position to take part in its deliberations, are yet anxious to learn and desirous of remaining in touch with scientific pharmacy. And accordingly we recommend that the committee on scientific papers to be chosen at this meeting be instructed to make provision for such a popular lecture to be given at our next annual meeting.

Respectfully submitted,

W. A. PUCKNER, *Chairman*,
E. H. GANE, *Secretary*,
CHAS. E. CASPARI, *Associate*.

Mr. Puckner desired to read by title only his address as Chairman under the title of "Recent Progress in Analytical Chemistry," and the Chair asked for the pleasure of the Section. The General Secretary thought it would be rather a discourtesy to make a motion to that effect, after the Chairman had gone to the trouble to prepare the paper, as required by the By-laws, and called attention to the fact that, heretofore, there had been only a Chairman's Address, whereas this year there was also a report from the Committee on Scientific Papers. Thereupon, Mr. Mayo moved that the Chairman be allowed to read his address by title, and that the report of the Committee on Scientific Papers be received and referred to a committee of three, to be appointed by the Chair, to consider its recommendations and make report to the Section to-morrow. This motion was seconded by Mr. Kebler and carried. The Chair appointed on the Committee Messrs. J. A. Koch, Edward Kremers and George M. Beringer.

The Chairman's Address here follows :

The By-laws of the Association direct me to present matters of interest to this Section. Taking refuge behind a precedent established by my predecessors, I shall instead present matters which interest me exceedingly, and which I hope may be of some interest to the members of this Section, namely, some recent progress in analytical chemistry.

The most distinct progress in the domain of analytical chemistry without doubt has been the better realization that analysis rests upon the same scientific foundation on which all chemical knowledge is based, and that a correct knowledge of all happenings

in the course of an analysis is just as desirable as it is in the synthesis of a new complex organic compound. This is well shown by the gradual replacement of manuals and text-books on analytical chemistry, of the cook-book variety, by books in which a systematic effort is made to explain the reactions which occur and the conditions to be aimed at in the course of an analysis. While there are those who insist in speaking of the "art of analysis" and who consider the discussion of chemical theories and laws as applied to analytical chemistry as "not in the interest of sane teaching," even they, I think, will admit that the application of modern theories of chemistry has broadened the horizon of the analyst, and when I recall my own helplessness as a student, as I floundered through long, unintelligible directions of analysis, I can but congratulate our young student that he was born at a later day.

Looking somewhat more closely at the progress in analytical chemistry, it is seen that progress has been made in several directions. First, through the application of the modern conception of the theories of solution, ionization, mass action and reversible reactions, theories perhaps destined to a short life but which yet have given us a better understanding of many things. Second, through the elaboration of methods for the ready determination of physical constants such as boiling- and melting-points, molecular weight, index of refraction, etc. Third, the production or discovery of a vast number of new organic compounds each year, many of which find practical use, and hence are added to the list of substances which the analyst must be prepared to recognize and examine, has resulted in much work being done to systematise the recognition and estimation of organic compounds. This has led to the replacement of many poorly understood color tests by reactions which demonstrate the presence of definite substances, groups or radicles. Fourth, many new substances have found use as reagents, and for many old reagents new uses have been found. Fifth, old methods are receiving a more and more critical study, and disputed points are gradually being solved.

It would be futile to attempt a review of all that has been accomplished, and I would instead recall to you some recent work along the lines indicated:

1. Modern theories of solution in analysis. While such acids as formic acid and acetic acid may be correctly estimated by titration with volumetric alkali with phenolphthalein as indicator, some difficulty is encountered when stearic, palmitic or oleic acid is to be determined in the same way. First, because of their insolubility in water, and second, because their alkali salts undergo *hydrolysis*, that is, to a certain extent are decomposed by water with formation of free alkali, the first rendering direct titration tedious, the second causing neutrality or slight alkalinity to be indicated before the theoretical amount of alkali has been added. While, to overcome these difficulties, it has been customary to dissolve the fatty acids in alcohol, it has often been questioned whether true neutrality was thus attained.¹ Recent investigations² seem to show that the addition of alcohol does overcome this hydrolysis, and that correct results are obtained if alcohol is added so that the finished titration contains forty per cent. of ethyl alcohol.

A customary method of estimating iron in ferric solutions depends on its reduction by means of iodide in strong acid solution and titration of the iodine so liberated. This reduction is quantitative only when much free acid is present. It has now been shown that this reaction between ferric iron and iodides with formation of ferrous iron and free iodine can be *reversed* by neutralizing the solution. A method has been devised³ whereby ferrous iron is estimated by titration with iodine just as arsenous compounds are titrated, but while in the arsenic titrations the acidity is kept down with sodium bicarbonate this can not be done here. Rochelle salt is used instead which by virtue of

¹ E. Hirsch, Ber. d. d. chem. Gesell., 35, 2874.

² O. Schmatolla, Ber. d. d. chem. Gesell., 35, 2905. O. Kanitz, Ber. d. d. chem. Gesell., 36, 400.

the *slight dissociation* of tartaric acid keeps the solution sufficiently low in hydrogen ions to permit a quantitative reaction.

It is well known that in the titration of sulphurous acid with iodine either the sulphurous acid solution must be very dilute or else it must be added to an excess of iodine. The reason why low results are obtained when a rather concentrated solution is titrated is not well understood. Bunsen believed it due to the reduction of sulphuric acid by hydrogen iodide, both formed during the titration. Volhard showed that this was not correct, and concluded that the mutual reduction of sulphur dioxide and hydrogen iodide with formation of elementary sulphur and iodine, $\text{SO}_2 + 4\text{HI} = \text{S} + 2\text{H}_2\text{O} + 4\text{I}$, took place. The explanation has been questioned¹ and some proof offered that the low results are due only to the volatility and ease of oxidation of sulphur dioxide, and this has since, at least in part, been confirmed.² To avoid loss of sulphur dioxide through volatilization it has repeatedly been tried to make the titration in the presence of an excess of sodium bicarbonate but without entire success. It has now been found that the titration of sulphur dioxide with iodine in presence of sodium bicarbonate is feasible,³ and that former attempts failed because it was not known that the *speed* of the reaction between sulphurous acid and iodine is much less in alkaline solution and that some time must be allowed for it to take place.

The extent to which the *strength* or *degree of dissociation* may affect a reaction is well shown in a method of estimating thiosulphates in presence of sulphites.⁴ It is well known that thiosulphates are decomposed by acids with liberation of sulphur dioxide and free sulphur and that weak acids bring about this change much more slowly; it has now been found that if to a thiosulphate solution sodium acetate and acetic acid be added that the large amount or concentration of acetate so far decreases the strength of the acid that thiosulphates are not affected even on boiling. Under these conditions sulphites are still decomposed, and hence if a solution contains both sulphite and thiosulphate the first may in this way be completely decomposed, its sulphur dioxide expelled by boiling and then the thiosulphate estimated by titrating with iodine.

2. Physical constants in analysis. While fully appreciating the value of the determination of physical constants such as melting-point, boiling-point, molecular weight, conductivity, etc., in establishing the identity and purity of a substance, the analyst has often been unable to determine such constants because of the amount of material required for such a determination and because of the work involved. Methods for the determination of boiling-point when but a few drops of liquid are available⁵ and specific gravity with one cubic centimeter or less of liquid⁶ may be taken as illustrations of efforts towards adapting such physical methods to the needs of the analyst.

Suggesting the possibilities of the microscope in analysis we have methods for the microscopic recognition of phenols⁷ based on the appearances of the characteristic precipitates and for alkaloids⁸ where their refractive index is determined, these methods being proposed as substitutes for the customary and rather treacherous color reactions commonly used. While not proposed as an analytical method, a microscopic determina-

¹ A. Berg, Bull. Soc. Chim., Paris (3), 27, 1077 (Chem. Centrbl., 1902, 1, 249).

² F. Raschig, Z. f. angewante Chem., 17, 577 (Chem. Centrbl., 1904, 1, 1621). On the other hand, Joh. Pinnow, Z. anal. C., 43, 91, found that dilution would affect the result even when the sulphite solution is added to the iodine.

³ E. Rupp, Ber. d. d. chem. Ges., 35, 3694.

⁴ Dupre, Jun., and W. Korn, Z. f. angew. Chem., 15, 225 (Chem. Centrbl., 1902, 1, 950).

⁵ Mulliken's Identification of Pure Organic Compounds, p. 222.

⁶ *Ibid.*, p. 228.

⁷ Behren's, Zeitschf. f. anal. Chem., 42, 14.

⁸ P. Kley, Zeitschf. f. anal. Chem., 43, 160.

tion of molecular weight requiring less than fifty milligrams of substance¹ should be mentioned as showing the possibilities of the microscope.

3. Analysis of organic compounds. As was before stated, the rapidly-increasing number of carbon compounds emphasizes the desirability of some comprehensive systematic scheme for their identification. When one recalls the many difficulties encountered in the elaboration of a scheme for the successive determination of the few commonly-occurring metals, the futility of any attempt of devising such a scheme for the almost endless number of carbon compounds is apparent. The very material progress that nevertheless has been made is well shown by a brief glance at a recent publication of a work dealing with the identification of organic compounds.² The author divides the carbon compounds into orders according to their elementary composition, thus "order one" contains the compounds of carbon and hydrogen, and carbon, hydrogen and oxygen. Order 1 is divided into "genera," aldehydes, carbohydrates, acids, phenolic compounds, etc. The genera are usually subdivided into "divisions" or "sections" according to some striking physical property, such as solubility. Under the sections the "species" are finally given. In the identification of a compound the "ordinal" tests, or tests for the elements, are first applied. Supposing the compound contains carbon and hydrogen, while nitrogen, chlorine, sulphur, etc., are absent then it belongs to Order 1 and the generic tests are next applied. Again, supposing that it has not responded to the characteristic tests for aldehydes, carbohydrates, acids or phenols then the generic tests for the presence of esters, namely, saponification, is applied and its saponification number is determined. The esters are divided into two divisions, solid and liquid, the species belonging to the solid division classified according to their melting-points, the liquid according to their boiling-points. For each liquid ester, and about 250 are described, the boiling-point and saponification equivalent is stated and then the ester is finally identified through its saponification products. The book abounds in methods which are simple, practical, yet carefully worked out in every detail, and marks a distinct advance in organic analysis.

The tendency to base the recognition and estimation of organic compounds on the properties of certain peculiar radicles or groups is well illustrated by a recent publication³ devoted to the analysis and the determination of the constitution of organic compounds in which sixty-eight pages are devoted to the hydroxyl radicle and thirty-eight pages to primary amines.

As regards the estimation of specific substances it is interesting to note the host of methods proposed for certain individuals, and that each method, since it is based upon the properties imparted to the substance by a certain group or radicle, can be applied to many other substances containing the same group. The estimation of formic aldehyde having received considerable attention on account of its very general use as a disinfectant, preservative and antiseptic, may be taken as an illustration. While Legler's ammonia method or some of its modifications,⁴ depending on the formation of hexamethylene-tetramin or "urotropin" when formaldehyde is treated with ammonia water, have been much in favor for some years, it has now been shown to be liable to error⁵ because the compound formed is a weak base, and as such combines with acid, while at the same time it is liable to break up into ammonia and formaldehyde and thus gives an

¹ G. Barger, Ber. d. d. chem. Ges., 37, 1754.

² S. P. Mulliken, A Method for the Identification of Pure Organic compounds.

³ Hans Meyer: Analyse u. Konstitutionsermittlung organischer Verbindungen.

⁴ L. F. Kebler, Am. J. Phar. 70, 432; A. G. Craig, J. Am. Chem. Soc., 26, 639; Hugo Schiff, Chem. Ztg., 25, 743 (Chem. Centrbl., 1903, 1, 364); L. Reuter, Pharm. Rev., 21, 207.

⁵ Z. Peska, Chem. Ztg., 25, 743 (Chem. Centrbl., 1901, 2, 871); L. Vanino, Pharm. Centr. H., 44, 751 (Chem. Centrbl., 1903, 2, 1250); C. Kippenberger, Z. anal. Chem., 42, 687.

indefinite end-point when the residual ammonia is determined by titration with acid. Error is also liable to be introduced through the ammonia water containing carbonic acid with which the indicator rosolic acid gives no sharp end-point and because commercial formaldehyde solutions, although neutral, at times contain a body which reacts with ammonium hydroxide. It has been proposed to base formaldehyde estimations on the formation of condensation product, anhydro-formaldehydanilin, formed when it is added to anilin solution; ¹ on the condensation of formaldehyde and hydrazin, forming formalazin; ² on the condensation with catechin; ³ on the combination with sulphite, either by measuring the sulphite so combined by a residual titration with iodine, ⁴ or using the normal sulphite and determining the alkali set free; ⁵ by its reducing action on silver salts, ⁶ potassium permanganate, ⁷ iodine, ⁸ or hydrogen dioxide. ⁹ The iodine method and the hydrogen dioxide method have generally been found to give correct results, and, being simple in detail, they are now in pretty general use. Since nearly all methods of estimating formaldehyde depend on the reactivity of the aldehyde group or radicle it is not surprising that these methods may be used to estimate other substances containing the aldehyde group. And thus the sulphite methods have been applied to the assay of essential oils whose valuable constituents are aldehydes, such as oil of lemon, ¹⁰ orange, carraway, cassia, etc., ¹¹ and the iodine method to the determination of aldoses, *i. e.*, sugars that are aldehydes. ¹²

4. New reagents. Of new reagents employed and new uses for old reagents I would mention:

Carbon tetrachloride has been used as a solvent in fat extractions in place of ether, chloroform or gasoline. ¹³

Phenylhydrazine has been substituted for ammonium hydroxide in the precipitation of certain hydroxides: being a weaker base than ammonium hydroxide an excess will not redissolve any precipitated aluminum hydroxide, while its reducing action will change any ferric iron to the ferrous condition and thus will permit a direct separation of aluminum from iron, manganese, calcium and magnesium. ¹⁴

Anilin, another weak base, has been used for similar separations. ¹⁵

Hydrazine or diamide, a powerful reducing agent, has been used to estimate iodates, ¹⁶ bromates, ¹⁷ hypochlorites, ¹⁸ and to standardize volumetric iodine solutions. ¹⁹ In each

¹ Klar, Pharm. Ztg., 40, 611.

² A. Pfaff Chem. Ztg., 26, 701.

³ R. Clausen, Ber. d. d. chem. Gesell., 36, 101.

⁴ M. Ripper, Monatsh. f. chem., 21, 1079 (Chem. Centrbl., 1901, 1, 477).

⁵ G. Lemme, Chem. Ztg., 27, 896 (Chem. Centrbl., 1903, 2, 911; C. Kleber, Pharm. Rev., 22, 96; A. Seyewetz and Gibello, Bull. Soc. Chim., Paris (3), 31, 691; Chem. Cent., 1904, 2, 263).

⁶ L. Ganino, Z. anal. Chem., 40, 587.

⁷ Vanino and Seitter, Z. anal. Chem., 40, 587.

⁸ G. Romijn, Z. anal. Chem., 36, 18.

⁹ Blank and Finkenbeiner, Ber. d. d. chem. Gesell., 31, 2979.

¹⁰ Kremers and Brandel, Pharm. Rev., 22, 15.

¹¹ S. S. Sadtler, J. Soc. Chem. Ind., 23, 303; H. C. Burgess, The Analyst, 29, 78.

¹² G. Romijn, Z. anal. Chem., 36, 349.

¹³ A. P. Bryant, Journ. Am. Chem. Soc., 26, 568.

¹⁴ Hess and Campbell, J. Am. Chem. Soc., 21, 776.

¹⁵ E. T. Allen, J. Am. Chem. Soc., 25, 421.

¹⁶ E. Riegler, Z. anal. Chem., 42, 677.

¹⁷ Max Schlotter, Z. anorg. Chem., 37, 164.

¹⁸ Roberto and Roncali, L'Industria Chimica, 6, 93 (Chem. Centrbl., 1904, 2, 1294).

¹⁹ R. Stolle, Journ. pract. Chem. (2), 66, 332.

case the halogen is reduced to the halide form while the nitrogen of the hydrazine is set free, and either the halide precipitated with silver nitrate or else the nitrogen measured.

Benzidin or diamido-diphenyl, $\text{NH}_2\text{CH}_2\text{—CH}_2\text{NH}_2$, forms salts, which when dissolved in water, are so strongly hydrolyzed that their acid radicle may be determined by titrating with alkali; the sulphate is but very sparingly soluble in water. Based on these properties sulphates may be determined either by precipitating with a standard solution of benzidin chloride and determining the excess with standard alkali,¹ or else by titrating the precipitated benzidin sulphate.²

Left tartaric acid has been proposed as a reagent for right or ordinary tartaric acid,³ the test depends on the insolubility of calcium racemate and permits the detection when the solution contains only 0.001 per cent. r-tartaric acid.

A certain fungus, when growing in water containing arsenic will develop a garlicky odor, probably due to arsine, and hence has been proposed as a reagent for arsenic.⁴

Potassium iodate may be taken as an illustration of the extended use to which certain reagents are put. Under ordinary conditions five molecules of alkali iodide and one molecule of iodate react with six equivalents of an acid to form three molecules of water and liberate six atoms of iodine. This reaction has been used for the quantitative determination of iodide by titrating the iodine liberated when excess of acid and potassium iodate is added to the iodide solution. It may also be used to standardize sodium thio-sulphate upon the iodine set free when adding a definite amount of potassium iodate to an excess of iodide and acid,⁵ and for the detection and determination of free acid, i. e., acidity, by adding the substance under examination to an excess of neutral solution of iodide and iodate, and calculating from the liberated iodine as indicated by a thio-sulphate titration.⁶ While potassium iodate solution rendered acid with acetic acid will liberate iodine from an iodide, no reaction is brought about by bromides or chlorides, and hence the reactions may be used to recognize iodide and to separate it from bromides and chlorides.⁷ If iodide and iodate react in presence of much hydrochloric acid, then iodine chloride, and no free iodine forms, and in this way potassium iodate has been used to estimate iodides, free iodine, chlorates, chromates and arsenides.⁸

5. Improvements of old methods. As is well known, an estimation of sulphate, as barium sulphate, is liable to be inaccurate because of a tendency of barium sulphate to drag down certain impurities, and considerable work has been done to determine in what form these impurities are carried down, and under what conditions a pure barium sulphate may be obtained. A recent investigation seems to have shown that the presence of iron causes incorrect results because a portion of the sulphate remains in solution as a ferri-sulphuric acid and a part is precipitated as barium ferri-sulphate, from which, on ignition, sulphur trioxide is given off, and ferric oxide remains behind. Potassium causes excessive results because of the formation of complex salts of barium sulphate and potassium salt ($\text{NO}_3\text{—Ba—SO}_4\text{—Ba—KSO}_4$ and $\text{Cl—Ba—SO}_4\text{—Ba—KSO}_4$). Sodium salts do not form these complex salts and in the determination of sulphur in pyrites, sodium carbonate, and not sodium potassium-carbonate should be used in the fusion.⁹

Further, it has been proposed to work in alcoholic solution, and to substitute strontium

¹ M. J. Mueller, Ber. d. d. chem. Gesell., 35, 587; Z. f. angew. Chem., 16, 653.

² F. Raschig, Z. f. angew. Chem., 16, 616, 818.

³ J. N. Broensted, Z. anal. Chem., 42, 15.

⁴ Beitr. Z. Chem. Physiol. u. Pathol., 5, 397 (Chem. Centrbl., 1904, 2, 1536).

⁵ Claude Walker, Z. f. angewandte Chem., 16, 99.

⁶ Franz Fessel, Z. anal. Chem., 38, 449.

⁷ S. Benedict and J. Snell, J. Am. Chem. Soc., 25, 809.

⁸ L. W. Andrews, J. Am. Chem. Soc., 25, 756.

⁹ R. Silberberger, Monatsh. f. Chem., 25, 220.

for barium, because the purity of strontium sulphate is not affected by the presence of other salts.¹

In an age when new discoveries are constantly introducing new complications into all fields of chemistry, when the constancy of valency is receiving severe shocks, when besides atoms and molecular reactions we must give heed to the antics of ions and electrons, when in every precipitation the equilibrium of the phases, the molecules and ions must be considered, it is a relief to note that some analytical processes are being simplified. In the estimation of phosphate or magnesium it has been customary to dry the magnesium-ammonium phosphate with its filter, to transfer the precipitate to the crucible, burn the filter on the crucible lid, to add the filter ash to the contents of the crucible, then to begin the ignition, using a very small flame at first. The precipitate was dried to avoid loss by spattering through escaping steam on beginning the ignition, the paper was burned separately to avoid reduction of phosphate by carbon, and the heat was increased very gradually to avoid loss through escaping ammonia and steam, and to avoid melting the precipitate, which would then attack the platinum and also become white only after prolonged heating. It has now been found that all these precautions are not necessary, that good results are obtained, that there is no loss through spattering, and that the mass quickly becomes perfectly white if the wet precipitate and filter paper are placed in the crucible, and at once the full Bunsen flame is applied.²

Mr. Puckner then resumed the chair, and called for the report of the Committee on the Ebert Prize. Mr. Kremers, chairman, presented the following :

REPORT OF COMMITTEE ON THE EBERT PRIZE.

Gentlemen: Your Committee has gone over the papers presented to this Association at the Mackinac meeting and has endeavored to judge them in the spirit that prompted the donor of this prize in 1873. "Originality" and "determined merit" are the words that stand forth boldly in the letter of transmittal of the fund.

There are two papers which, in the opinion of your committee, come nearest to fulfill these requirements, but both papers, though of greatest excellence as representative of the class to which they belong, are short and of the nature of preliminary reports rather than of finished papers.

Your Committee would, therefore, respectfully recommend that these two papers be taken into consideration when their authors make further reports on the same subjects.

The two papers are: (1) On the crystalline substances of prickly ash bark, by H. M. Gordin, and (2) Contribution to the chemistry of chelidonium, by J. O. Schlotterbeck and H. C. Watkins.

EDWARD KREMERS, *Chairman*,
LEO ELIEL,
ALBERT SCHNEIDER.

On motion of Mr. Kebler, the report of the committee was adopted.

In the absence of the Chairman, E. L. Patch, Mr. E. H. Gane was asked to present the report of the Committee on Drug Market, which he did.

¹ R. Silberberger, Ber. d. d. chem. Gesell., 38, 2755.

² M. Schmoeger, Z. anal. Chem., 37, 308; Hugo Mastbaum, Z. anal. Chem., 37, 581.

REPORT OF COMMITTEE ON DRUG MARKET.

Your Committee have occasion to complain of the continued failure of members to respond to our solicitation to report all variations from the usual standards that come to their attention.

In the hope of securing valuable information bearing upon the work, the Committee sent to the chemical and pharmaceutical manufacturers and to several importers and jobbers the following circular letter, asking their coöperation :

"The Committee on the Drug Market of the American Pharmaceutical Association desire to make their report as representative and valuable as possible. To this end they have voted that the chairman be requested to invite the coöperation of the manufacturers of the United States. The Committee will esteem it a great favor if you will communicate to them at an early date any departures from the standard in drugs and chemicals that have come to your attention during 1903, and up to June 1, 1904, that you consider to be of general interest and of value to their report. They also request you to contribute any subsequent data coming to your attention, to be used in future reports. Such contributions will be duly credited to your analytical department.

Please address all correspondence to the Chairman of the Committee.

For the Committee.

Yours truly,

E. L. PATCH, *Chairman.*

Some have already responded and sent reports, while further coöperation is promised. Your committee would call attention to the needless exactions placed upon many products and the incompleteness of many of the U. S. P. 1890 tests, but for the expectation of their correction in the forthcoming revision of 1900.

The coöperation of the Drug Laboratory at Washington has been continued, and much of value is anticipated from the efforts being made to secure accurate data upon the value of assay methods. An effort is being made to secure the coöperation of many in a re-examination of morphimetric methods, and in uniform testing of a line of chemical products.

Bulletin No. 80, *Adulterated Drugs and Chemicals*, issued by the Bureau of Chemistry, contains much of interest and value to pharmacists. It calls attention to a condition, the existence of which is a constant source of annoyance and difficulty, consisting in the uncertain application of the terms C. P., Pure, Purified, Twice Purified, etc.; products of all degrees of purity appearing indiscriminately under all these designations, so that label and price are no guarantee of purity, and every package must be examined to decide upon its value.

In this connection your Committee would call attention to complaints constantly made in relation to the great variation of the products sent out by the same house. One lot will be all that could be desired; another, under the same label, will be very inferior in quality, containing foreign salts and a large amount of dirt and other extraneous matter. It has been said that the failure of many American chemicals to respond to the simple test of making a clear solution, has discredited them in foreign markets. Attention to these details may mean increased cost of production, but the house that establishes a solid reputation in this particular, should ultimately secure an adequate return in increased business.

Your Committee would direct attention to the growing scarcity of many valuable drugs of American origin, and refer to the article of Dr. Kraemer in the *Am. Journ. of Pharmacy* for Dec., 1903; and the monograph upon the Cultivation of Drug Plants in the U. S., by Dr. R. H. True, appearing in the *Year Book of the Dept. of Agriculture*; and in abstract in *Oil, Paint & Drug Reporter*.

Encouragement should be given to all efforts being made to stimulate interest in the cultivation of such drugs, and to introduce to cultivation many drugs of foreign origin that can be introduced to advantage.

The great advance in the price of golden seal from 17 cents to \$1.15 per lb.; of

crawley root from 14 cents to \$1.00 per lb.; of cotton root from 3 cents to 35 cents per lb.; senega root from 25 cents to 75 cents per lb.; serpentaria from 17 cents to 42 cents per lb.; mandrake from 3 cents to 9 cents; cannabis indica from 8 cents to \$1.00 per lb.; American saffron from 11 cents to \$1.35 per lb.; may not be properly chargeable to increasing scarcity alone, but an increased production would render such abnormal increase in price more difficult to bring about.

Complaint has been made that aloin is substituted in whole, or in part, by powdered aloes, and that the therapeutic effect of aloin combinations covers so wide a range of activity that the products must differ radically in composition. To ascertain the real facts, Mr. L. B. Havenhill kindly undertook the examination of 21 specimens of aloin obtained from the leading sources of supply, and the results are embodied at length in our report.

The following table gives details of the work done during the year:

Acetic Acid, Glacial.

Of ten samples 1 was 36.9 per cent.; one 82.5 per cent.; others over 98 per cent.

Acetic Acid, 36 per cent.

Of twenty samples one was 14.4 per cent.; one 14.8 per cent.; others 29 to 38 per cent.; sixteen were below 36 per cent.

Acetic Acid, 6 per cent.

Of twenty samples one was 2.2 per cent.; one 2.08 per cent.; one 3.02 per cent., and others from 3.9 per cent. to 7.5 per cent.; thirteen were below 6 per cent. J. H.

Carr, Thesis, Mass. Col. Pharm. ('03), '04.

Acid, Benzoic U. S. P., True.

Contains chlorine compound. L. F. Kebler, '04.

Acid, Boric C. P.

1. Contained trace of chloride and a salt of iron. L. F. Kebler, '04.

2. Contained chloride and salts of aluminum and magnesium. L. F. Kebler, '04.

3. Contained chloride and salts of aluminum and magnesium. L. F. Kebler, '04.

4. Contained chloride and salts of aluminum and magnesium. L. F. Kebler, '04.

Traces of calcium sulphate found in 15 lots common. Six lots of C. P. tested O.

K. E. L. Patch, '04.

Acid, Chromic (Chromic Anhydride.)

1. Contains 26.02 per cent. of acid sodium sulphate. L. F. Kebler, '04.

2. Contains 17.87 per cent. of acid sodium sulphate. L. F. Kebler, '04.

3. Contains 7.71 per cent. of acid sodium sulphate. L. F. Kebler, '04.

4. Contains 9.06 per cent. of acid sodium sulphate. L. F. Kebler, '04.

Contains large excess of sulphate and a large portion insoluble in water. E. L. Patch, '04.

Acid, Chromic, C. P.

8.88 per cent. acid sodium sulphate. L. F. Kebler, '04.

Acid, Citric, Acid, Tartaric and Cream of Tartar.

Almost always contain traces of lead. Prosecution of druggists in England have occurred through sale of these products. It is almost impossible to obtain them at present lead free. E. H. Gane, '04.

Forty barrels showed traces of iron and sulphate, no lead. E. L. Patch, '04.

Acid, Hypophosphorous. 50 per cent.

Assayed 35 per cent. Contained calcium oxalate and iron. E. L. Patch, '04.

Acid, Molybdic.

1. Contains 89.02 per cent. of MoO₃ and is contaminated with ammonium nitrate and phosphate. L. F. Kebler, '04.

2. 81 per cent. MoO₃ with ammon. nitrate and phosphate and fragments of excelsior. L. F. Kebler, '04.

3. C. P. 83.6 per cent. MoO_3 with ammon. nitrate. L. F. Kebler, '04.

4. Pure 83.5 MoO_3 with am. nit. and am. phosphate. Samples commonly called pure average 85 per cent. MoO_3 . L. F. Kebler, '04.

Acid, Phosphoric.

Several brands, labeled U. S. P., contain from 85 per cent. to 90 per cent., and range in sp. gr. from 1.710 to 1.757. The U. S. P. 1890 requirements are 85 per cent., and sp. gr., 1.710. The presence of iron and sulphates is also common in the trade acid. E. Merck & Co.

Acid, Salicylic.

Showed presence of hydrochloric acid. L. D. Havenhill, '04.

1 gr. tablets contained 0.83 gr. L. F. Kebler, '04.

Acid, Stearic.

Contained iron. E. L. Patch, '04.

Acid, Tannic.

No. 1. 1 per cent. insoluble in water. E. L. Patch, '04.

No. 2. 7 per cent. insoluble in water. E. L. Patch, '04.

Alcohol, Absolute.

98.66 per cent., 98.69 per cent., 98.81 per cent., 99 per cent., 99.52 per cent. by weight.

F. L. Patch, '04.

Alcohol, Ethyl, in barrels.

Contains aldehyde, much furfural, non-volatile brown residue (on steam bath), and reduces silver nitrate. L. F. Kebler, '04.

Aloins.

The table gives the results obtained by examination of 21 market samples, variously labeled as aloin, aloinium, aloin from aloe vera, aloin, C. P., etc., at different prices in lots of 25 pounds or more. They were sent out in cartons, paper packages and bottles, some of the latter bearing labels directing that the bottles be kept tightly corked. The figures in column No. 5 are relative only, the higher numbers denoting the degree of turbidity as indicated by the resin test proposed by C. A. Serre. (1) In applying this test 65 Mg. of aloin were shaken with 20 Cc. of water at 15° C. for one minute, and the turbidity observed as soon as the air bubbles had separated. The foam produced by shaking Nos. 9, 14, 16, 17 and 18 required an unusually long time to subside, which would seem to indicate the presence of some peculiar principle. The comparative results for emodin in column No. 6 were obtained colorimetrically by a modification of the Borntraeger test for oxymethyl-antraquinones. (2) The lower numbers represent the minimum amount of coloration, the higher, the maximum amount. The figures in the column headed "Moisture" indicate the percentage loss when 2.5 Gm. of the sample were heated to constant weight in an oven at a temperature of 100° to 105° C. The percentages of ash were obtained by incinerating 2.5 Gm. of sample received in a porcelain crucible at a low red heat. The samples differed somewhat in color, and according to degree I would arrange them in the following order, beginning with the palest yellow and ending with a greenish yellow, with the brighter yellows between, viz.: 9, 5, 21, 13, 12, 7, 6, 16, 15, 4, 1, 11, 3, 20, 8, 14, 2, 17, 19. They were all neutral to litmus paper, and responded alike to the tests for so-called barbaloin. Some surprise may be felt at the omission of the customary table of melting-points, but after repeated trials I am of the opinion that while in some special cases they may prove of value, in general but little dependence can be placed upon them. The rate of heating, the size of the capillary tube, and the method of dehydrating, all have a decided influence on the result, to say nothing of the difficulty in deciding when the transition point really occurs. Attempts at the direct assay of aloin have not been sufficiently satisfactory to warrant including any results in the table. A microscopical examination

showed all the samples to be composed of the same yellow crystals and amorphous material. If the samples were of pure barbaloin of the composition $C_{21}H_{20}O_4H_2O$ as proposed by E. Ledger (3), they should contain 14.75 per cent. of moisture, and the fact that they were found to contain considerably less might account for the presence of the amorphous material. It was noted that the samples with highest percentage of crystalline particles yield the most moisture. There is, however, a chance that this amorphous material may prove upon further investigation to be largely composed of the amorphous water-soluble material found by Tschirch and Pederson in Barbadoes aloes. (4) All the samples possess a slight odor of aloes, and in my opinion meet the U. S. P. requirements save in one particular, they do not volatilize without leaving a residue.

(1) Drug. Circ., 1895, 39, page 8.

(2) Zeit. Anal. Chem., 1880, page 165.

(3) Journ. Pharm. Chim., 1902 (6), t. 16, page 519.

(4) Arch. Pharm., 1898, 236, page 200-212.

TABLE OF RESULTS OF EXAMINATION OF ALOIN.

Sample.	Price.	Weight.	Container.	Resin.	Emodin.	Moisture. per cent.	Ash.
1.	\$0.38	20.00 G.	Paper package.	4	1	8.28	.3920
2.	.40	—	—	4	5	7.56	0.972
3.	.34	—	—	2	4	6.66	0.352
4.	.60	28.69 G.	Amber glass.	3	2	6.06	0.356
5.	—	29.12 G.	White glass.	3	2	5.83	0.300
6.	.38	28.90 G.	Carton.	4	3	7.91	0.436
(2) 7.	.40	28.91 G	Carton.	1	6	7.47	0.380
(2) 8.	.40	—	—	2	5	7.39	0.360
9.	1.00	—	—	—	1	6.99	0.300
10.	.40	—	—	4	5	5.81	0.580
11.	—	29.43 G.	Amber glass.	4	5	6.12	0.264
12.	.38	32.30 G.	Amber glass.	1	2	6.92	0.380
13.	—	29.12 G.	Amber glass.	1	1	6.18	0.360
14.	.45	28.45 G.	White glass.	2	1	4.56	0.240
15.	.40	28.36 G.	Amber glass.	4	4	5.72	0.400
(2) 16.	.40	—	—	2	2	7.06	0.544
(2) 17.	—	28.20 G.*	Carton.	2	2	7.36	0.560
18.	.36	28.72 G.	Carton.	2	4	7.08	0.818
19.	.36	29.45 G.	Amber glass.	4	5	6.12	0.808
20.	.45	30.49 G.	Amber glass.	5	5	5.22	0.428
21.	.40	28.50 G.	White glass.	—	1	6.27	0.380

While this table may not be as complete as is desired, it contains, in my opinion, all that can be offered in the light of the present conflicting literature and the lack of reliable chemical methods for determining the relative therapeutic value of different lots. L. D. Havenhill.

Aluminum Sulphate, C. P.

Incompletely soluble in water, makes a very bad solution. L. F. Kebler, '04.

Ammonia Water Reagent.

Contained 21.12 per cent. NH_3 —288 G. non-volatile matter to liter, of which .011 was fixed residue. L. F. Kebler, '04.

Ammon. Carbonate, C. P.

1. 65.33 per cent. tests—C. P. (Bicarbonate.)

* Package had leaked.

2. 67.42 per cent. tests—C. P. (Bicarbonate.)
3. Contained 3.22 per cent. carbonate and 95.42 per cent. bicarbonate, U. S. P. NH_4HCO_3 , $\text{NH}_4\text{NH}_2\text{CO}_3$, 156.77 contains 78 or nearly 50 per cent. carbonate, and yields 32.7 per cent. NH_3 .
4. 25 per cent. carbonate, 71 per cent. bicarbonate, giving 26.3 per cent NH_3 . Ammon. bicarbonate NH_4HCO_3 , 78.77, gives 21.77 per cent. NH_3 , which is 66.3 per cent. of U. S. P. E. L. Patch, '04.

Contained traces of lead. E. H. Gane, '04, Chem. & Drug., 1904, 203.

Ammonium Hypophosphite.

Contained 2 per cent. sulphate. E. L. Patch, '04.

Ammonium Sulphate, C. P.

Contained insoluble salt of aluminum. L. F. Kebler, '04.

American Arrowroot.

Cassava starch, zamia starch, potato starch, and mixtures are sold under this title. E. H. Gane.

Asafoetida.

1. 76 per cent. insoluble in alcohol. E. L. Patch, '04.
2. 77.5 per cent. insoluble in alcohol. E. L. Patch, '04.
3. 62 per cent. insoluble in alcohol. E. L. Patch, '04.
4. 67 per cent. insoluble in alcohol. E. L. Patch, '04.
5. Contained 30 per cent. starch, much common resin and only enough asafoetida to give it odor. Had passed N. Y. Custom House. E. H. Gane, '04.
6. Contained 70 per cent. mineral matter, earth, stones, etc. Had passed N. Y. Custom House. E. H. Gane, '04.

Barium Hydroxide, C. P.

Contains iron, chlorides, sodium salts, and is incompletely soluble in hydrochloric acid. L. F. Kebler, '04.

Barium Hydroxide, Common.

Contains nitrate and chlorides in varying proportions. Nine casks assayed: 78.8 per cent., 79.2 per cent., 87.6 per cent., 88.4 per cent., 88.8 per cent., 89.2 per cent., 90 per cent., 90.8 per cent., 90.8 per cent. E. L. Patch.

Beeswax.

Adul. with sulphur, starch, flour, Japan wax, tallow, paraffin, ozokerite, etc. F. J. Smith, Amer. Drug., 1904.

Adul. with 33 per cent. cassava starch. Imported from Mexico via. New York. L. F. Kebler, '03.

A mixture of ceresin and Japan wax artificially flavored. L. F. Kebler, '03.

Beef Extract.

Mixed with, or substituted by, yeast extract. (Marmite.) Chem. & Drug., 1904, 24 and 58. E. H. Gane.

Belladonna Leaf.

Contains 50 per cent. of flowers and tops of poke root (*Phytolacca violacea*). Am. Drug., 1904, 207.

Sample submitted assayed 0.438 alkaloid; 9 bales received assayed 0.12, 0.14, 0.11, 0.10, 0.13, 0.12, 0.13, 0.30, 0.11. L. F. Kebler, '04.

11 bales assayed 0.32, 0.3, 0.36, 0.4, 0.24, 0.4, 0.4, 0.42, 0.36, 0.4, 0.4. E. L. Patch, '04.

Belladonna Root.

Mixed with, or substituted by, root of *Phytolacca decandra*. Schweiz. Wochenschr., 42, 33. E. H. Gane, '04.

4 bales assayed 0.6, 0.64, 0.6, 0.62. E. L. Patch, '04.

Benzole, Pure.

Boiling-points 90°–150° C. Consists largely of toluene and xylene. L. F. Kebler, '04.

Bismuth Preparations.

Reduced with chalk. N. Y. Board of Pharmacy, Sept. 10, '03.

Bismuth Carbonate.

Difficult to find free from traces of nitrate. Many samples gave distinctive reactions for copper and arsenic. E. H. Gane, '04.

Bismuth Subgallate.

14 lots represented 53 to 59 per cent. Bi_2O_3 . E. L. Patch, '04.

Borax.

60 per cent. of 169 samples adulterated. Mass. St. B. of Health, '01.

11 samples from drug stores were all pure. 9 samples from groceries—one free from borax, five mixed with sodium carbonate. J. J. Madden, Thesis M. C. P. '03.

Calcium Carbonate, C. P.

Contains iron, aluminum, magnesium, chlorides and material insoluble in hydrochloric acid. L. F. Kebler, '04.

Calcium Nitrate, C. P.

Contained chloride, aluminum and was incompletely soluble in water. L. F. Kebler, '04.

Calcium Oxide, C. P.

1. Contained traces of chloride, much sulphate and salts of aluminum and magnesium. L. F. Kebler, '04.
2. Contained chloride, sulphate, siliceous matter and an aluminum salt, was but little better than ordinary quicklime. L. F. Kebler, '04.
3. Contains chloride, iron and aluminum. L. F. Kebler, '04.

Calcium Phosphate, Precipitated.

10 lots contained iron and sulphate. 7 lots contained chloride, iron and sulphate. 1 lot contained carbonate, iron and sulphate. E. L. Patch, '03.

Camphor Oil.

Deficient in camphor. N. Y. Board of Pharmacy, Era, Sept. 10, '03.

Of 99 samples, 49 differed from standard. N. Y. Board of Pharmacy, Era, Jan. '04.

Spirit Camphor.

40 samples out of 215 made with wood alcohol. D. C., Mar. '03.

Of 86 samples, 33 below standard. N. Y. Board of Pharmacy, Jan. 4, '04.

Canada Balsam.

Largely adulterated with and substituted by Oregon balsam, a mixture of turpentine and resin. E. Dowzard, Chem. & Drug.

Cannabis Indica.

72.2 per cent. of standard, 83.6 per cent., 80 per cent., 79.6 per cent., 88 per cent., 89.2 per cent., 87 per cent., 40 per cent. E. L. Patch, '04.

(27 per cent. seeds, containing 26.4 per cent. fixed oil). E. L. Patch, '04.

(73 per cent. leaf, containing 6.3 per cent. ether sol. resin.) E. L. Patch, '04.

Cantharides, Russian.

Powd. 59 per cent. of standard. E. L. Patch Co. (35 per cent. C.), 6, '04.

Powd. 67 per cent. of standard. E. L. Patch Co. (0.4 per cent. C.), 6, '04.

Powd. 1.33 per cent. of standard. E. L. Patch Co. (0.8 per cent. C.), 6, '04.

Prepared Chalk.

Contained 2.1 per cent. insoluble in diluted acid. Consisted in part of sand. Contained iron chloride. E. L. Patch.

Chloral Hydrate, U. S. P.

Melting-point, 57°C . Contained a chloride, and was damp. L. F. Kebler, '04.

U. S. P. Damp. Melting-point, 54°C . Contained chloride and alcoholate. L. F. Kebler, '04.

Chloroform.

Had odor of carbon disulphide. Possibly from the container having been previously used for carbon disulphide. E. H. Gane, '04.

Chocolate.

25 per cent. starchy matter. Report Conn. Agric. Station, 1904.

Chocolate for Syrup.

Chiefly powdered cacao shells. Sayre, D. C., 1904, p. 144. L. D. Havenhill, '04.

Powdered Cinnamon.

Adulterated with previously exhausted galangal. W. Schmitz, D. C., May, 1903, 110, *Cochineal*.

30.81 per cent. ash and 17.25 per cent. ash, consisting of talcum and earthy matter. Should not yield over 3 to 6 per cent. ash. L. F. Kebler, '03.

Coffee.

Has 31 per cent. chickory and pea hulls. Report of Conn. Agric. Station, 1904.

Colchicum Root.

Much of the commercial root is low in alkaloidal contents, yielding 0.3 to 0.4 per cent. alkaloid. Average should not be below 0.5 per cent. E. H. Gane.

No. 1. .84 per cent. No. 2. .79 per cent. No. 3. .79 per cent. No. 4. .69 per cent. No. 5. .624 per cent. E. L. Patch, '04.

Colchicum Seed.

Frequently found of very inferior quality. Colchicine 0.3 to 0.4 per cent. E. H. Gane.

No. 1. .656 per cent. No. 2. .93 per cent. No. 3. .87 per cent. No. 4. .89 per cent. No. 5. .836 per cent. E. L. Patch, '04.

Colocynth Powder.

No. 40. 13.2 per cent. to 41 per cent. alcohol. E. L. Patch, '04.

No. 80. 20.7 per cent. to 41 per cent. alcohol. Same drug. E. L. Patch, '04.

Powder, 13.1 per cent. to 41 per cent. alcohol. E. L. Patch, '04.

Pulp, 46.5 per cent. to 41 per cent. alcohol. E. L. Patch, '04.

Powder, 20.7 per cent. to 41 per cent. alcohol. E. L. Patch, '04.

Copaiba Balsam.

3 samples adulterated with Gurjun balsam. Wm. K. Ilhardt, '04.

2 samples adulterated with Gurjun balsam. E. L. Patch.

Each 30 per cent. resin.

Copper Sulphate, C. P.

Marked "Absolutely free from iron"—contained iron. L. F. Kebler, '04.

Cream of Tartar.

Adulterated with acid sulphate of potassium. C. & D., 1904, 95. E. H. Gane.

Most on the market contains lead. E. H. Gane.

9 samples from drug stores—8 pure, 1 had 9 per cent. calcium nitrate.

17 samples from grocery stores—6 pure, 11 impure, ranging from 12 to 85 per cent. Chief adulterant, calcium sulphate. One contained tartaric acid. Several acid phosphates. Several had no potassium bitartrate. L. D. Havenhill, 1904.

Beechwood Creosote.

30 per cent. boiled below 200° C., U. S. P. and B. P., require 200° to 220° C. E. H. Gane.

Numerous low-boiling products are on the market. Some have been found in which 60 per cent. to 85 per cent. boils below 205° C. Sp. gr. varies from 1.072 to 1.081 (U. S. P. 1890, says "not below 1.070," but the purest creosotes are high in gravity, up to 1.080). E. Merck & Co.

Cubeb.

Contains 15 per cent. stems, 11 per cent. worthless berries, and yielded 6.58 per cent. oil, instead of 12 per cent. L. F. Kebler, 1903.

Damiana.

Sophisticated with (ash damiana) *Turnera humifera*. Leaf has resemblance to the genuine in shape, odor and taste, but has a more grayish color, a more woolly touch and appearance, and the leaf, stem and buds are pubescent. J. U. Lloyd, '04.

Diastase.

Not diastase of malt. Very little action on starch mucilage. E. L. Patch, 1904.

Distilled Water.

Distilled from tinned copper. 0.0007 arsenic per liter.

Distilled from glass. 0.0011 arsenic per liter.

0.0150 potass. nit.

Gautier, D. C., 1903, 257. 0.0100 ammonia.

0.160 sod. bicarb. ('04).

Of 20 samples all contained organic matter, 5 sulphates, 13 chlorides, 7 calcium. All were distilled but spoiled by long standing. J. J. Madden, Thesis, M. C. P. ('03).

Contains 0.0028 to 0.006 of fixed residue per liter, and 0.28 parts of free ammonia per million with traces of nitrates and nitrites. The U. S. P. 1890 standard appears to be a little rigid. L. F. Kebler, '04.

Dragon's Blood.

Mixed with colophony. C. & D., 1904, 95. E. H. Gane.

Ether, Acetic.

Contained 60 per cent. acetic ether, 40 per cent. water and alcohol.

Acetic ether labeled U. S. P. contained 0.635 of non-volatile residue, chiefly calcium chloride; evidently not redistilled after dehydrating with calcium chloride. L. F. Kebler, '04.

Acetic ether, rectified, contained 80 per cent. acetic ether and 0.288 G. non-volatile matter per liter, having odor of crude calcium acetate. The same article was also labeled U. S. P. L. F. Kebler, '04.

Ether, U. S. P.

Contained aldehyde, foreign odor, hydrogen peroxide and was unduly acid to litmus. L. F. Kebler, '04.

Formaldehyde.

Many carloads of inferior product sold in the West for treating smut in grain. The treatment is based on the use of a 40 per cent. product and these inferior lots are entirely valueless when used as 40 per cent. Many samples were examined with the following results: 31.8 per cent., 38.6 per cent., 39.7 per cent., 31.16 per cent., 35.3 per cent., 38.6 per cent., 28.2 per cent., 31.41 per cent., 26.3 per cent., 35.5 per cent., 29 per cent., 23 per cent. D. F. Jones, '04.

Gamboge.

Contained rice starch. Some millers make the erroneous claim that gamboge cannot be powdered without the addition of some inert powder. E. H. Gane.

Gentian Root.

Powd. gentian root adul. with powd. almond shell and pine wood. H. S. Collins, Chemist & Druggist. E. L. Patch, '04.

Guaiacol, C. P.

43 per cent. boils under 200° C., 45 per cent. between 200° and 205° C. Text books are conflicting. U. S. D., 206° to 207° C. Thorpe Dict. Chem. 200° C. Allen Com. Org. Analysis 204° to 205° C. Attfield 200° C. Tilden (Watts) 200° C. E. H. Gane.

Guaiac Resin.

1. Dark powder, poor odor. Insol. in alcohol, 5.5 per cent. E. L. Patch, '04.

2. Good color, good odor, good taste. Insol. in alcohol, 16 per cent. E. L. Patch, '04.

3. Fair color, fair odor. Insol. in alcohol, 21 per cent. E. L. Patch, '04.

4. Fair color, good odor, smoky taste. Insol. in alcohol, 24 per cent., woody residue. E. L. Patch, '04.

5. Good color, fair odor, poor taste. Insol. in alcohol. E. L. Patch, '04.

Hyoscyamus.

Assay, 0.08, 0.10, 0.15, 0.15. E. L. Patch, '04.

Tr. Iodine.

Many samples made with wood alcohol. N. Y. Board of Pharmacy, '03; Era, Sept. 10, '03.

Other samples below strength. N. Y. Board of Pharmacy, '03; Era, Sept. 10, '03.

Of 116 samples to Jan. 4, 1904, 55 differed from standard.

Iodoform.

55 per cent. lycopodium and other matter. N. Y. Board of Pharmacy; Pharm. Era, Sept. 10, '03.

Ipecacuanha.

Root of *Richardsonia scabra* offered in London market. C. & D., 1904, 326. E. H. Gane.

Does not contain any emetine.

Iron Phosphate, Precipitated.

So-called blue phosphate of iron, the hydrous ferrous phosphate $\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$, usually containing some ferric phosphate and some oxide. B. P. requirement at least 47 per cent. 6 lots assayed, 44.75 per cent., 52.6 per cent., 63.45 per cent., 70.99 per cent., 86.82 per cent., 65.95 per cent. J. L. Patch, '04.

Iron and Potassium Tartrate.

Very dark, almost black in color, partially insoluble in water. Contained unconverted ferrous and ferric hydrates. E. H. Gane.

Yielded 34 per cent. ferric oxide instead of 21.4 per cent. Contained large amount of sulphate. E. H. Gane.

Syrup Iodide of Iron.

Made by retailer, 9.75 per cent. Wm. K. Ilhardt, '04.

Made by manufacturer, 8.2 per cent., labeled "U. S. P." Wm. K. Ilhardt, '04.

Made by manufacturer, 7.7 per cent., labeled "U. S. P." Wm. K. Ilhardt, '04.

Made by manufacturer, 2.7 per cent., labeled "Syr. Iod. Iron." Wm. K. Ilhardt, '04.

Made by manufacturer, 2.85 per cent., labeled "Syr. Iod. Iron." Wm. K. Ilhardt, '04.

Made by manufacturer, 9.5 per cent., labeled "Syr. Iod. Iron. 10 per cent." Wm. K. Ilhardt.

Made by manufacturer, 8.25 per cent., labeled, "Syr. Iod. Iron. U. S. P." Wm. K. Ilhardt.

Jaborandi.

53 per cent., 56 per cent. of standard. E. L. Patch, '04.

Difficult to obtain satisfactory alkaloidal strength. Many lots only yield 0.25 alkaloid. E. H. Gane.

A new variety (*Naudeloupe*) termed Guadeloupe jaborandi, from *pilocarpus racemosus*, has appeared in the London market. It contained 0.34 per cent. of alkaloid. Pharm. Journ., Nov. 14, '03, page 713. E. H. Gane.

Sophisticated with inferior jaborandis and with leaflets of a species of *swartzia*, bearing a fairly close resemblance to the genuine but entirely lacking the leaf dots and the emarginate apex. J. U. Lloyd, 1904.

Jalap.

300 out of 500 cases rejected at New York as assaying 7 per cent. instead of the standard 12 per cent. Oil P. & D. Reporter, June 1904.

No. 1. 6.35 per cent. No. 2. 9.94 per cent. No. 3. 11 per cent. No. 4. 11.34 per cent. No. 5. 22.14 per cent. E. L. Patch, '04.

No. 1. 8.66 per cent. No. 2. 8 per cent. No. 3. 9.66 per cent. No. 4. 7.5 per cent.

All passed N. Y. Custom House. Representing 8000 lbs. E. H. Gane, '04.

33 bags, representing 4800 lbs., 7.25 per cent. resin. E. H. Gane, '04.

Lead Acetate, C. P.

Contained lead oxide and was very dirty. L. F. Kebler, '04.

Very badly carbonated, some iron and very dirty. E. L. Patch, '04.

Chlorinated Lime.

Contained 25.06 per cent. of available chlorine. L. F. Kebler, '04.

Contained 30.33 per cent. and 35.55 per cent. available chlorine. E. L. Patch, '04.

Linseed Meal.

22 out of 25 samples contained mineral oil. A. H. Ackerman, Thesis, Mass. Col. of Pharm., '03.

(Such results are sometimes obtained in pure samples, owing to dependence upon defective methods of saponification, etc.). '04.

Lithium Bromide, C. P.

Assayed, 95.06 per cent. Li Br. E. H. Gane, '04.

Eff. Lithia Tablets, 3 gr.

Contained 1.05 gr. citrate. E. L. Patch, '04.

Lycopodium.

Contained starch. E. L. Patch, '04.

Magnesia, Calcined.

Frequently contains much carbonate, either from careless manufacture or from long exposure to the air. Most commercial samples when calcined show a loss far exceeding the pharmacopoeial allowance of 5 per cent. One sample lost 25 per cent. E. H. Gane, '04.

Magnesium Oxide, C. P.

Contained 2.18 per cent. of anhydrous sodium sulphate. L. F. Kebler, '04.

Magnesium Carbonate.

The medicinal varies considerably. Samples of one maker examined at varying times show a wide range of purity, testing from 90 to 98 per cent. carbonate. E. H. Gane, '04.

Male Fern.

Largely mixed with rhizomes of other ferns, as *Asp. spinulosum* and *Atherium felix-femina*. A. Penndorf, Apoth. Zeit. E. L. Patch, '04.

(Fl. extracts gave from 6.6 per cent. to 18.3 per cent. crude felicin.) E. L. Patch, '04.

(Fl. extracts gave from 1 per cent. to 7.3 per cent. folic acid.) E. L. Patch, '04.

(Must ppt. the clear sol., 0.4 to 3 per cent.) D. C., 1903, 108. E. L. Patch, '04.

Mercuric Oxide, C. P.

Incompletely soluble in nitric acid, and contained non-volatile matter. L. F. Kebler, '04.

Methylene Blue.

Products containing other dyes are on the market. 40 per cent. foreign dye found in one sample. Zinc and arsenic are no longer found in the medicinal goods. E. Merck & Co.

Oil Bergamot.

Oil turpentine added at time of distillation. O. P. D. Rep., June, '04. E. L. Patch, '04.

Oil Cade.

Foreign odor, sp. gr. 0.945, instead of 0.990. E. L. Patch.

Oil Cassia.

Adulterated with common resin. Schimmel & Co., Report April, 1904. E. H. Gane.

Oil Citronella.

Contained 20 per cent. alcohol. Chem. & Drug., 63, 1061, '04.

Oil Lavender.

Oils have benzoic acid added to raise index of saponification. Schimmel & Co. E. L. Patch.

Oil Lemon.

41 per cent. of 17 samples adulterated. Mass. St. B. of H. ('04).

Olive Oil.

Imported. Wholly substituted by peanut oil. L. F. Kebler, '04.

Oil Origanum.

Very dark. Tarry odor. Sp. gr. 0.874, heavy. E. L. Patch.

Oil Patchouly.

Mixed with an ester containing oil, possibly borneol. C. & D., 1904, page 815. E. H. Gane, '04.

Oil Peppermint.

Contained 15 per cent. acetin. (A mixture of three acetic acid esters of glycerin made by heating glycerin and glacial acetic acid for several hours). C. T. Bennett; Chem. & Drug. ('04).

9 samples, all dementholized, three contained oil camphor. H. L. Scott, Thesis M. C. P. (If the U. S. P. test of preparation in freezing mixture was relied upon, it should be noted that all depends upon the temperature. A range of 20° C., may result according to manipulation of the freezing mixture and a sample condemned by one be approved by another. A definite temperature should be insisted upon. E. L. Patch, '04.

Oil peppermint contained cedar-wood oil. Chemist & Druggist, 1904, 854. E. H. Gane.

Oil Rose.

Contained oil rose gerani., salol and acetanilid. Schimmel (D. C., Jan., '03). E. L. Patch, '04.

Oil Savin.

Most of the commercial oil is distilled from *Juniperus virginiana*, and is entirely different in physical properties from the oil obtained from the official plant. Sp. gr. about 0.870. Insoluble in equal volume of alcohol. Optical rotation, 5° to 7°. E. H. Gane.

Opium Tincture.

Of 32 samples, 12 differed from standard. N. Y. Board of Pharmacy, Jan., '04.

Black Pepper.

10 per cent grape stones. Ph. Era, Sept. 10, '03. E. L. Patch, '04.

Pepsin.

Sold as 1-10,000, barely 1-6,000. E. L. Patch, 1904.

Phenacetin.

Out of 373 sample: 267 pure acetanilid; 16 acetanilid, starch, etc.; 58 pure phenacetin. D. C.

Potassa—Highest Purity.

Assayed 81.5 per cent. KOH. L. B. Havenhill, '04.

Assayed 84.93 per cent. pure, contained excess of chloride and sulphate. L. F. Kebler, '04.

Potassium Bichromate, C. P.

Contained chloride. A product free from chloride is readily obtained. L. F. Kebler, '04.

Potassium Carbonate, C. P.

Contained insoluble matter and chloride. L. F. Kebler, '04.

Contained 1.25 per cent. chloride. E. L. Patch, '04.

Potassium Chloride, C. P.

1. Contained salts of sodium and magnesium. L. F. Kebler, '04.

2. Consisted almost entirely of sodium chloride. L. F. Kebler, '04.

3. Contained 10 per cent. of sodium chloride. L. F. Kebler, '04.

Potassium Citrate.

1. Free citric acid, 0.42 per cent.; chloride, 0.26 per cent. E. L. Patch, '04.
2. Free citric acid, 1.05 per cent.; chloride, 0.37 per cent. E. L. Patch, '04.
3. Potassium carbonate, 1.38 per cent.; some chloride. E. L. Patch, '04.
4. Citric acid, .98 per cent.; chloride, 0.42 per cent. E. L. Patch, '04.
5. Citric acid, .89 per cent.; chloride, 0.26 per cent. E. L. Patch, '04.

Potassium Cyanide.

Contains traces of silver frequently. Pharm. Centralb., 44, 617. E. H. Gane.
 Tested 98-100 per cent. pure. Is a mixture of sodium and potassium cyanides with
 12.74 per cent. of sodium chloride to make it test properly. Labelled "Pure."
 L. F. Kebler, '04.

Potassium Cyanide, 98 Per Cent.

Consisted of 59.43 per cent. of potassium cyanide. L. F. Kebler, '04.
 Consisted of 30.00 per cent. of sodium cyanide. L. F. Kebler, '04.
 Consisted of 10.49 per cent. of sodium chloride. L. F. Kebler, '04.

Potassium Nitrate, C. P.

Contained a trace of chloride. L. F. Kebler, '04.

Potassium Permanganate, C. P.

Contained trace of chloride, much sulphate, was of poor physical appearance, and
 titrated 97.14 per cent. pure. L. F. Kebler, '04.
 7 lots common, 3 contained chloride, 1 sulphide, 2 sulphate and chloride, 1 sulphate,
 nitrate and chloride. E. L. Patch.

Potassium Sulphate, C. P.

Contained chloride and an undue amount of mechanical impurities. L. F. Kebler, '04.

Solution Potassium Silicate.

"We have no true silicate of potassium to offer. We know of none to be had in the
 U. S. Once in a while a shipment comes from Europe. Most sold here is silicate of
 soda with a little silicate of potass. stirred in so as to give K reaction. For all tech-
 nical purposes the NaSi. will answer as well. 7, 2, '04.

Quinine Mixture.

Claim 2 grains of quinine to each fluidram. Did contain 0.048 quinine and 0.064 cin-
 chonine. E. L. Patch.

Rochelle Salt, C. P.

Contains much insoluble material. L. F. Kebler, '04.

Saffron, Valencia.

Contained 25 per cent. of Calendula flowers. E. H. Gane.

Scammony Root.

Root of Orizaba jalap or male jalap offered in London market as a substitute. Pharm.
 Journ., 1904, 327. E. H. Gane.

Resin Scammony.

Resin of Orizaba root. (Male jalap) from *Convolvulus Orizabensis* is identical with
 scammony resin, and sold as such. Root yields 17-18 per cent. Weigel, Pharm.
 Centralb. (W. D., April, '04, 194). E. L. Patch, '04.
 1. 81.4 per cent. sol. in ether; resin. E. L. Patch, '04.
 2. 49.4 per cent. sol. in ether; gum. E. L. Patch, '04.
 3. 90.3 per cent. sol. in ether; resin. E. L. Patch, '04.
 4. 90.8 per cent. sol. in ether; resin. E. L. Patch, '04.
 5. 50.5 per cent. sol. in ether; resin. Contained wheat starch. E. L. Patch, '04.
 6. 26 per cent. ether sol. resin. E. L. Patch, '04.

Fl. Ex. Senega.

Alcohol, 27.7 per cent. instead of 60 per cent. E. L. Patch Co.
 Extractive, 16.3 per cent. instead of 35 per cent. E. L. Patch Co.

Soap Liniment.

Of 90 samples, 23 differed from standard. Jan., '04, N. Y. Board Pharmacy.

Sodium Bicarbonate, C. P.

Contained chloride. L. F. Kebler, '04.

Sodium Bromide.

15 samples—some bromate and small amount of sulphate. E. L. Patch, '04.

Sodium Chloride C. P.

Very dirty, and contained magnesium chloride. L. F. Kebler, '04.

Sodium Citrate.

1. 0.2 per cent. free citric acid—some chloride. E. L. Patch, '04.

2. Alkaline—17 per cent. sodium chloride. E. L. Patch, '04.

Sodium Hydroxide by Alcohol.

Contained excess of chlorides and sulphates. L. F. Kebler, '04.

All grades of purity except that made from metallic sodium are contaminated with chlorides, sulphates, silicates, carbonates and an aluminum compound. L. F. Kebler. Even that from metallic sodium does not always test pure. L. F. Kebler.

The same is true of potassium hydroxide. L. F. Kebler.

Sodium Phosphate.

31.8 per cent. of 66 samples adulterated. Mass. St. B. of H. (01), '04.

C. P. 30 G. contained 0.0002 arsenic. L. F. Kebler, '04.

Sodium Sulphite, Dried.

68 per cent. anhydrous, large excess sulphate, allowable amount of chloride. E. L. Patch.

C. P., 78 per cent. anhydrous, large excess sulphate, allowable amount of chloride. E. L. Patch.

Common, 73 per cent. anhydrous, large excess sulphate, allowable amount of chloride. E. L. Patch.

84 per cent. anhydrous, large excess sulphate, allowable amount of chloride. E. L. Patch.

1. Commercial, 92.06 per cent. pure, the best product the Drug Laboratory has been able to find. L. F. Kebler, '04.

2. Recrystallized, 89.56 per cent. pure. L. F. Kebler, '04.

3. Pure crystal, 86.79 per cent. L. F. Kebler, '04.

4. C. P., cryst., 84.48 per cent., and contained metallic impurities. Not equal to commercial grade. L. F. Kebler, '04.

5. C. P., cryst., 75.9 per cent. pure, and contained 22.78 per cent. sulphate; a very poor article. L. F. Kebler, '04.

Sodium Thiosulphate, C. P., Cryst.

Alkaline to phenol phthalein, contained chloride, iron and insoluble matter; a very poor product, inferior to ordinary commercial grade. L. F. Kebler, '04.

Precipitated Sulphur.

88.8 per cent. of 18 samples adulterated. Mass. St. B. of H. (01), '04.

Tests well, except to contain traces of calcium chloride. L. F. Kebler, '04.

Contained 0.4 per cent. ash, principally calcium chloride. Residue looks much heavier than it is. Ought the U. S. P. to exclude such a product? L. D. Havenhill, '04.

Tannin.

56.6 per cent. of 30 samples adulterated. Mass. St. B. of H. (01), '04.

Tartar Emetic.

Contained calcium chloride, excess of sulphate and arsenic. E. L. Patch, '04.

Tragacanth.

Powder adulterated with flour. L. D. Havenhill, '04.

Uranium Chloride.

Contaminated with a salt of copper and sodium sulphate. The latter on an anhydrous basis to the extent of 33 per cent. L. F. Kebler, '04.

Whiskey.

All of 9 samples adulterated. Mass. St. B. of H. (01), '04.

Zinc Oxide.

3 bbls. English. Free from iron, with traces of chloride and sulphate. E. L. Patch, '04.

3 bbls. American. Iron, chloride and sulphate. E. L. Patch, '04.

Zinc, White.

Sold to artists as strictly pure zinc white, but contains 50 per cent. of barium sulphate. W. K. Ilhardt, '04.

On motion of Chas. Caspari, Jr., the report was received and referred for publication.

The Chair called for reports from committees, and Mr. Edward Kremers presented in abstract a "Report of the Committee of Reference on Tests of Aristol," authorized at the Mackinac Island meeting last year, first explaining that the report had been submitted to Mr. Beringer, at whose request the committee had been appointed to do this work.

MR. BERINGER: I ask that the report be read.

MR. CLIFFE: I think what we are directly interested in is as to whether the figures placed on these packages are in accord with the reports of this committee, and of course to find that out it is necessary to hear them.

MR. ANDERSON: I would like to ask if this report is from Mr. Beringer or the committee.

THE CHAIR: It is a report from the committee.

Mr. Kremers then read the report as follows:

REPORT OF THE COMMITTEE OF REFERENCE ON TESTS OF ARISTOL.

[In accordance with action taken as per Proceedings, A. Ph. A., 1903, p. 233.]

Samples 1 to 9, inclusive, were received by A. B. Prescott, Ann Arbor, Oct. 13, 1903, from Prof. Charles Caspari, Jr., Baltimore, by American Express Company. Sample 10, received November 4, 1903, through J. O. Schlotterbeck, from L. F. Kebler, chief of the United States Drug Laboratory.

All the samples were kept by A. B. Prescott in the original packages, in the dark, in a safe, until June 28, 1904, when each sample was opened, and divided into four nearly equal parts, which were put up in specimen tubes of glass with paraffined paper under the cork stoppers. Each tube was labeled, both on the glass and on the cork, with the number of the sample. One of the portions of each sample was allotted to each member of the committee for his analytical work, and one of the portions was retained in the custody of the chairman of the committee where it is still held. Number 10, however, was of about double quantity, in two original packages, one of which remains unbroken in the hand of the chairman. In the distribution of samples, divided as above stated, one of the portions of each sample was sent to Dr. Charles E. Caspari, at St. Louis, and one to Dr. Edward Kremers, Madison, on June 30, 1904, by American Express Company.

The samples were numbered, arbitrarily, from 1 to 10, and the original packages as received bore printed and written terms as follows: (a) Printed matter of the manufact-

urer; (b) inscription of date of purchase, name or initial of purchaser, etc., except that such inscription is lacking upon Nos. 5 and 10; (c) a pen-written memorandum of analysis, distinct but more or less abridged, and in most cases with the name or initials of Virgil Coblentz, there being no such inscription for sample 10.

Sample 1. (a) "Shoemaker & Busch, Wholesale Druggists, Philadelphia. Two ounces. Iodide of Thymol. Dithymol Diiodide." (b) "*Bought from Shoemaker & Busch, by order of N. Pennypacker, August 7, 1900, A. H. O'Malley.*" "*Sept. 24, 1900, A. G.*" (c) "*Ash found 18.2 per cent., should have no ash. Ether-insoluble residue 25 per cent., should be sol. Na_2CO_3 6.8 per cent. Dithymol diiodide & starch with NaI & NaCl . V. Coblentz, New York.*

Sample 2. (a) "Dithymol Diiodide." (b) "*Bought of Philip Toussaint, 292 Bowery, N. Y. C., June 18th, 1900, O. R. Palmer. Rec. from Mr. Palmer, June 19, 1900, H. S. V. C., 6/4/02.*" (c) "*Ash = 2 per cent. Ether insol. = 22.2. Starch. K. I. Na_2CO_3 = 9 per cent. Dithymol Diiodide.*

Sample 3. (a) "Di-thymol Di-iodide. One ounce. A substitute externally for Iodoform and Aristol. Prepared by A. C. Smith, 254 Euclid Ave., Cleveland, Ohio." (b) "*Rec. from Cleveland, by Adams & Co., H. S., Sept. 9/99.*" (c) "*Dithymol Diiodide mixed with ZnO .*"

Sample 4. (a) "One ounce Di-thymol Di-iodide. Jones Bros. & Co., Toronto, Canada. Jones' Di-thymol Di-iodide." (b) "*J. B. C.*" (c) "*Ash = 27 per cent. Ether insol. = 34.8 per cent. ZnO . NaI . NaCl . color. V. Coblentz, N. Y.*

Sample 5. (a) "One ounce Di-thymol Di-iodide. (Hauschildt Process.) Chemische Fabrik von Hauschildt & Co., Hamburg, Germany. T. E. Hanbury & Co., Manufacturers' Agents, German Chemical Products a specialty, New Orleans, La." (b). (c). "*Ash = 42 per cent. Ether insol. = 33 per cent.*"

Sample 6. (a) "One ounce Thymol Iodide, Di thymol Di-iodide, $\text{C}_{20}\text{H}_{24}\text{I}_2\text{O}_2 \cdot 2\text{H}_2\text{O}$. Prepared by George M. Beringer, Camden, N. J." (b) "*H. S., April 24, 1900, Phila., April 2, 1902, bought of Geo. M. Beringer by W. K. Mattern. F. K., April 2, 1900.*" (c) "*G. M. Beringer, Phila., Pa. Ash = 27 per cent., Ether insol. = 37.1 per cent. NaI - Di thymol Di iodide. V. Coblentz, N. Y.*"

Sample 7. (a) "Di thymol Di-iodide. One ounce. A substitute externally for Iodoform and Aristol. J. T. Gibbons, Pittsburgh, Pa., Penn. Bldg." (b) "*Bought of J. T. Gibbons, Pittsburgh, F. K., 2/11/1900. 80 c. by express, 2/19/1900, J. O. M.*" (c) "*Ash = 33.7 per cent., Ether-insoluble = 46 per cent. Fe_2O_3 . CaCO_3 . NaCl . Na_2CO_3 = 3.1 per cent. No Thymol deriv. V. Coblentz, N. Y.*"

Sample 8. (a) "One ounce Aristol. Reuter & Co., Basle." (b) "*Received from J. Mayson, 270 E. Houston St., New York City, Sept. 2, 1900, via Wells, Fargo & Co. Express, O. R. Palmer.*" (c) "*Ash = 42 per cent. Ether insol. = 46 per cent. ZnO . Fe_2O_3 . Di-thymol Di-iodide very little.*"

Sample 9 ["Counterfeit Box"]. (a) "One ounce Aristol. Farbenfabriken vorm. Friedr. Bayer & Co., Elberfeld (Germany)." (b) "*H. D. M., Apr. 30, 1902.*" (c) "*Ash = 42 per cent. Ether-insoluble = 62 per cent. Na_2CO_3 = 4.2 per cent. Fe_2O_3 . NaCl . CaCO_3 . Di-thymol Di-iodide. German Tablet Co., Detroit.*"

Sample 10. (a) "One ounce Thymol Iodide (Beringer). Di thymol Di-iodide, $\text{C}_{20}\text{H}_{24}\text{I}_2\text{O}_2 \cdot 2\text{H}_2\text{O}$. Prepared by George M. Beringer, Camden, N. J. (b) (c).

ASH DETERMINATION.

The results of Prescott were obtained as follows:

A weighed quantity, from about 0.250 Gm. to about 0.500 Gm., was burned in a porcelain crucible (Berlin ware), over the flame of a Bunsen burner. The heat of the crucible was gradually raised to a low dull redness, and this maintained until the combustion was completed, as shown by the disappearance of the black color of the residue, and

more exactly by reaching a constant weight in the usual manner. Throughout the combustion a current of oxygen was carried into the crucible through a clay pipe, the bowl of which was fitted into the crucible. The oxygen was supplied from a gasometer through a purifying train of caustic potash solution and of dried calcium chloride, at a rate of about sixty bubbles in a minute. At the low dull red heat maintained, there was no difficulty in obtaining a quite constant weight in two weighings, one before and one after a final ignition. For example, crucible and contents, 7.6467 Gm.; ignited again and cooled in desiccator, 7.6466 Gm. The differences in weight were not permitted to exceed 0.0002 Gm. It had been found, however, that if a combustion was finished at a bright red heat, constant weight could not be obtained, owing in most cases to vaporization of sodium chloride or other metallic halides.

The results of Dr. Kremers were obtained by the same process as described by Dr. Prescott.

The results of Dr. Caspari were obtained as follows:

From 0.500 Gm. to 1.000 Gm. of the sample was accurately weighed off directly into a platinum crucible in which the ignition was carried out. Difficulty was experienced at first in obtaining an ash of constant weight, but this was overcome by heating the crucible only to a dull red heat and continuing the heating for a longer time. The crucible was heated directly over a Bunsen burner and the heating was continued at dull red heat until an ash of constant weight was obtained. If the crucible was heated much higher it could be seen that some of the inorganic halides were volatilized. There was no evidence that the platinum was attacked, at the comparatively low temperature used, by any of the ingredients of the aristol. In each determination the weights of the ash were constant to within 0.0004 Gm.

THE DETERMINATION OF ETHER-INSOLUBLE MATTER.

The results tabulated for all the samples in the column headed "Prescott" were obtained as follows: From about 0.300 Gm. to about 0.500 Gm. of the aristol was treated with about 160 times its weight of ether, or 10 Cc. of ether for every 0.045 Gm. of aristol, by maceration and percolation in the manner below stated. The ether used was of the specific gravity of 0.710 at 25° C. The filter paper was that washed in hydrochloric and hydrofluoric acids, cut in disks of 9 cm. diameter. A filter was folded in a truncated cone to fit into a Gooch perforated crucible of porcelain, with capacity of about 25 Cc., and the weighed portion of aristol placed therein. The crucible containing the sample was placed in a small beaker and one-tenth of the required amount of ether added, the beaker covered and allowed to stand ten minutes. The crucible was then removed, allowed to drain and replaced in the beaker and another tenth of the ether added. This was repeated a third time. The crucible was then placed on a suction flask and washed with the remaining ether, and dried in an air bath at 95° C. to constant weight.

Samples 7-8-9, under this treatment, gave results somewhat unsatisfactory, owing to coloring matter and other finely-divided material which passed through the filter. In the analyses by Prescott several other methods were tried upon these samples with no better results. Filtration through cartridges after macerating forty-eight hours still failed to yield a clear filtrate. It will be observed that these samples which gave discrepant duplicates of ether-insoluble matter, samples 7, 8, 9, were samples having much foreign material, as shown by their ash percentages, respectively, 34.99 per cent., 41.63 per cent., 42.09 per cent. The method chosen for determining the ether-insoluble matter, therefore, seems to be a consistent method for aristol itself.

The determination of ether-insoluble matter by Dr. Kremers, as given in the tabulation, was carried out as follows:

About 2 Gm. of the sample were accurately weighed out and loosely packed in the inner tube A, of an extemporized extraction apparatus shown in the accompanying cut,

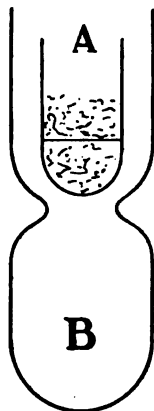
Fig. 1. B was filled about three-quarters with ether, and the whole heated in a water-bath, the percolator being connected with a reflux condenser. The extraction was allowed to go on until the percolate and also the residue in A were colorless. Tube A was then taken out, more ether added to the liquid in B, which was then filtered to remove any particles that might have passed through mechanically. The filter paper was washed with ether until colorless, the entire filtrate being collected in a tared capsule.*

The residue from A was then transferred to the filter paper and washed with a little ether to see if extraction had been complete.

The clear ethereal solution in the tared capsule was allowed to evaporate spontaneously. The capsule and residue were then kept at the constant temperature of 50° C. in an oven, until the weight became constant. The difference between the weight of aristol used and the weight of ether-soluble residue, was taken as the weight of ether-insoluble residue.

In the column headed "Caspari" the ether-insoluble portion was determined as follows: Use was made of a Soxhlet extraction apparatus. In this way the amount of ether soluble matter was determined directly and the amount of ether-insoluble matter was obtained by difference between the amount of sample weighed off and the amount of ether-soluble matter found. The agreement between duplicate determinations shows that this method is capable of giving accurate results. The ether used for the extraction was ordinary U. S. P. 1890 ether, which left no residue on evaporation. The extraction thimbles used were the standard Schleicher & Schull extraction thimbles. These were always extracted several times with pure ether before the determination was made. About 2,500 Gm. of the sample was weighed off and introduced into the extraction thimble. This was then extracted from ten to fifteen times with ether, until the ether which siphoned off left no residue upon evaporation. The ether was then distilled from the extraction flask and contents were dried at the temperature of the boiling water bath and weighed. This weight, minus the weight of the flask, gave the weight of ether-soluble matter, which subtracted from the weight of the original sample, gave the weight of ether-insoluble matter. The weight of the extraction flask was a fraction over 30 Gm., and about 2,500 Gm. of the sample was used to avoid large percentage errors due to small errors in weighing. The filtrate from the extraction apparatus was always perfectly clear, and no difficulty was experienced from having small portions of the sample pass through the extraction thimble.

FIG. 1.



* The capsule was cleaned and heated to 50° C. before being weighed.

PERCENTAGES OBTAINED.

	Caspari.		Kremers.		Prescott.	
	Ash.	Ether Insol.	Ash.	Ether Insol.	Ash.	Ether Insol.
<i>Sample 1:</i>	A..... 7.99	13.97	7.01	10.9	A..... 7.29	11.03
	B..... 7.73	—	—	10.7	B..... 7.13	11.11
	Ave... 7.86	13.97	—	10.8	Ave... 7.21	11.07
<i>Sample 2:</i>	A..... 11.38	27.80	13.00	29.3	A..... 13.33	20.74
	B..... 11.78	27.44	—	27.9	B..... 13.73	20.43
	Ave... 11.58	27.62	—	28.6	Ave... 13.53	20.58
<i>Sample 3:</i>	A..... 13.89	17.98	13.6	16.7	A..... 14.71	17.07
	B..... 13.22	17.80	—	—	B..... 14.49	16.94
	Ave... 13.55	17.89	—	16.7	Ave... 14.60	17.00
<i>Sample 4:</i>	A..... 25.70	37.13	29.8	34.9	A..... 30.17	34.19
	B..... 26.04	36.85	—	—	B..... 30.19	34.10
	Ave... 25.87	36.99	—	34.9	Ave... 30.18	34.14
<i>Sample 5:</i>	A..... 20.55	36.59	29.0	32.8	A..... 21.26	28.80
	B..... —	36.32	28.2	—	B..... 21.68	28.73
	Ave... 20.55	36.45	28.6	32.8	Ave... 21.47	28.76
<i>Sample 6:</i>	A..... 1.76	3.80	2.4	5.2	A..... 2.31	6.04
	B..... 2.04	—	—	6.04	B..... 2.26	6.10
	Ave... 1.90	3.80	—	5.62	Ave... 2.28	6.07
<i>Sample 7:</i>	A..... 32.67	55.40	34.17	41.9	A..... 35.00	46.77
	B..... 32.24	55.06	—	—	B..... 34.98	47.64
	—	—	—	—	C..... —	49.08
	Ave... 32.45	55.23	—	41.9	Ave... 34.99	47.79
<i>Sample 8:</i>	A..... 41.43	68.93	42.09	55.0	A..... 41.99	54.07
	B..... 40.83	—	—	53.8	B..... 41.27	52.33
	—	—	—	—	C..... —	49.05
	Ave... 41.13	68.93	—	54.4	D.... —	48.56
<i>Sample 9:</i>	A..... 41.69	69.13	42.1	58.3	A..... 42.03	68.94
	B..... —	68.92	—	—	B..... 42.16	63.54
	Ave... 41.69	69.02	—	58.3	Ave... 42.09	66.24
<i>Sample 10:</i>	A..... 2.58	11.96	3.03	15.9	A..... 3.36	10.90
	B..... 2.72	11.82	—	—	B..... 3.40	11.22
	Ave... 2.65	11.89	—	15.9	Ave... 3.38	11.06

Respectfully submitted,

EDWARD KREMERS,
CHARLES E. CASPARI,
ALBERT B. PRESCOTT,
Committee.

MR. HALLBERG: I should like to ask now which particular numbers of these specimens are those which were presented last year as being the product of Mr. Beringer's establishment, and the figures on them.

MR. GOOD: Is there any serious objection to telling us what these specimens are—what were those samples? Many of us know and many of us do not know.

MR. KREMERS: Sample No. 6 was marked: "1 oz. Thymol Iodide. Prepared by Geo. M. Beringer, Camden, N. J." It is marked on one end, "H. S., April 24, 1900;" and on the other end, "Phila., April 2, 1902. Bought of Geo. M. Beringer by W. K. Mattern." On one side it bears the endorsement, "F. K., April 2, 1900," and underneath that the words, printed with a pen, "G. M. Beringer, Phila., Pa. Ash, 27 per cent.; ether insol., 37.1 per cent., NaI, Di-thymol Di-iodide. V. Coblenz, N. Y." Those are the marks on the box, as recorded by Mr. Prescott. This is the first one included in this list so far as Mr. Beringer is concerned.

MR. ECCLES: Tell us the Committee's figures as compared with that.

MR. KREMERS: The ash given by Mr. Coblenz is 27 per cent.; the committee finds an average of 1.90, 2.4 and 2.28. (Applause.) Ether-insoluble, by Mr. Coblenz, 37.1 per cent.; the committee finds an average of 3.80, 5.62 and 6.07. (Applause.) Serial No. 10: (a) "1 oz. Thymol Iodide (Beringer). Di-thymol Di iodide. Prepared by George M. Beringer, Camden, N. J." (b) (c) That is all. I have not seen the sample, and do not know.

Mr. Schlotterbeck explained that, as chairman of the Scientific Section last year he had promptly procured samples of No. 10 in the open market, and sent them to the committee immediately after the Mackinac Island meeting.

MR. KREMERS: The committee's report shows, as to sample No. 10: Ash, an average of 2.65, 3.03 and 3.38 per cent. Ether-insoluble, 11.89, 15.9 and 11.06 per cent.

MR. HALLBERG: These specimens that have just been examined by this committee, and remnants of which are supposed to be in that sealed box, are those the identical specimens exhibited last year, or new lots bought in the open market afterwards?

MR. KREMERS: In accordance with Mr. Schlotterbeck's explanation, and according to this report, sample No. 6 was evidently one on the table last year, and examined by Mr. Coblenz. Sample No. 10 was the one obtained by Mr. Schlotterbeck, as Chairman of the Committee, in open market.

MR. SCHLOTTERBECK: The direction of Mr. Beringer's resolution, adopted last year, was, that it was desirable to obtain new samples in the open market, and I attempted to do so, but could not find any, except at Mr. Beringer's place of business, and that is sample No. 10, alluded to. The other samples are those that were on the table last year.

Mr. Kirchessner here moved to receive the report.

MR. BERINGER: Mr. Chairman, if in order I would like to make some remarks on this subject. I should like to see these boxes that were on the table last year. I have never had an opportunity to examine them. I have a special reason, which I will explain to the committee, for desiring to see the markings on the packages.

Thereupon Mr. Cliffe moved that Mr. Beringer be granted permission

to examine these boxes, and the motion was seconded by Mr. Kirchgessner, and carried.

Mr. Beringer here came forward and examined the boxes that had held the products investigated by Mr. Coblentz and the committee: Mr. Beringer then said:

It is very natural that I am intensely interested in this subject, and have been for thirteen months past. I have slept over it, dreamt over it, and worried over it. I felt assured that some gross error had occurred, and for that reason challenged the figures. The figures on package No. 1 there, labeled as coming from Shoemaker & Busch, indicate an analysis by Virgil Coblentz of ash, 18.2 per cent.; ether-insoluble, 25 per cent. The average of the committee, three investigations, show, ash, 7.36 per cent.; ether-insoluble, 11.95 per cent. Sample No. 6, which was a sample of my own product on the table at that time, was marked, "ash, 27 per cent.; ether-insol. 37.1 per cent." The committee's report shows an average of three results, as ash, 2.19 per cent.; ether-insoluble, 5.16 per cent. I have in my possession a letter from Mr. Coblentz, in which he assures me that these samples were gotten out and marked by his assistant. I will submit, however, if that package is not marked in his own handwriting. How could it, then, have been gotten out and marked by his assistant? I will invite any gentleman to compare the writing on that box and this letter here, and say if they are not in his own handwriting. Furthermore, he says the ash in No. 1 was 18.2 per cent. In this letter he says it should have been marked .18 of one per cent. The committee report shows an average of 7.36 per cent. In my own case, he writes me, the ash was .27 of one per cent., whereas it was marked 27 per cent. The figures of the committee show 2.19 per cent. I cannot understand the reasons that actuated him to present a report of that character before this committee. I cannot understand the animus that would warrant anybody in bringing such a matter before this Association. I felt last year when the matter was first presented, that a gross injustice was being done, not only to myself individually, but also to the Association, and that such false statements should not come before this body, and go unchallenged.

Here is a sample of the statements made at the meeting last year. I will read a statement from an article presented there: "Aristol, containing 65 per cent. of free alkali." The alkali used in this preparation is sodium hydroxide. Any intelligent pharmacist will consider what this statement amounts to. Would a preparation containing 65 per cent. sodium hydroxide, which is so deliquescent, remain in a powdered condition? That is the sort of evidence that has been presented before this Section to establish this adulteration.

I felt it my duty to myself and the Association to call the attention of this Section and the Association to what was undoubtedly a gross error and a rank injustice. I believed it was but due to myself that this aspersion upon my character should be openly and carefully investigated, so that if I deserved censure I should receive it, and if I deserved vindication it should be promptly accorded.

MR. HALLBERG: It seems that some action should be taken on the report of this committee, and certainly Mr. Beringer is entitled to vindication at the hands of this Association. Just what form that should take I do not know, but the report of the committee certainly seems to leave no doubt of the fact that a grievous error has been committed—a grievous wrong done a worthy member of this Association—and pretty strong evidence has been presented that gross carelessness has been committed on the part of somebody. I believe before we adjourned last year a resolution was adopted to the effect that, in the future, no specimen should ever be publicly exposed at the meeting giving the identity of the maker, unless it was ordered for some special reason. My recollection is, that was done.

MR. GOOD: It seems to me that Mr. Beringer is amply vindicated by the report of this committee. It is the best vindication he could have. As to what action shall be taken towards Mr. Coblentz is a very different matter. It is fair to presume—that is, it is charitable to assume—that he has made a very gross mistake unintentionally. I can hardly think that he would maliciously make such a report as that against a member of our Association, knowing that no member of this Association would rest under such a reflection; if he knew he was innocent, he would demand an investigation. Mr. Beringer has demanded an investigation, and vindication has come to him. But, as I say, it is charitable to assume that Prof. Coblentz was unintentionally led into a gross error, in some inexplicable way. I am entirely willing that Mr. Beringer shall indicate what he considers is due him, and I move to receive the report of the committee and refer for publication in the same manner in which the report was published last year.

MR. CLIFFE: I amend that motion to the effect that the published report contain the discussion which has occurred upon this question. I think it only fair to Mr. Beringer that the complete report of the committee be published in the Proceedings, as well as the discussion that has occurred here this afternoon.

MR. GOOD: My motion was to receive the report and refer for publication. We have a Committee on Publication, and that Committee has been wrestling with this matter, and I say let them continue to wrestle with it.

MR. CLIFFE: But we propose to instruct them in the matter.

MR. MAYO: As a matter of information, Mr. Chairman, permit me to ask Mr. Beringer whether—and this is rather a delicate question—in his opinion it would be better to publish the entire report, or simply publish the result of that report, in the same way the result of the investigation was published. I wish to get his opinion on that. We members wish to do what will suit Mr. Beringer, and serve the ends of justice, without encumbering the Proceedings with unnecessary matter. If we approve the report and leave it to the Publication Committee to publish a summary in a similar manner to the previous publication, would that do? I would like Mr. Beringer's opinion on that.

MR. BERINGER: My own opinion is this: Inasmuch as considerable publicity was given to the matter by the trade journals, the house organs, and by some of the drug manufacturers and otherwise, thus making it a matter of publicity not only in this country but abroad, I think it is only fair that publicity should be given to the results of this Committee. I have refrained from saying an uncharitable word in this matter, but I think the report of this Committee should be published, just as it is, without any comment.

MR. SAYRE: Do you mean without any discussion?

MR. BERINGER: The discussions are always edited by the Committee on Publication; that is their business.

MR. LEMBERGER: I second the motion of Mr. Cliffe that the report of the committee be published in the Proceedings, along with the discussion on the subject, and, in a spirit of fairness, I want you to place yourself in Mr. Beringer's position and try to realize the gross injustice that has been done him. I think you would all feel as he feels.

Mr. Cliffe's motion was then put to a vote by the Chair and carried.

The original motion of Mr. Good to receive the report was also put and carried.

MR. BERINGER: Now, Mr. Chairman, I move that the committee be discharged with thanks, and that they be requested to present their bill.

The motion was put and carried.

MR. BERINGER: The statements regarding thymol iodide are so incorrect that I feel the subject deserves careful investigation. I have heretofore made some experiments along this line myself, but I hope somebody else will take up the subject of iodides of thymol and carefully investigate it. I think they will arrive at this conclusion: That commercial iodides of thymol are not definite chemical compounds, as they are reputed to be, but mixtures of iodides in varying proportions—that there is more than one iodide of thymol—and that they contain notable traces of free iodine, in some cases amounting to four or five per cent. Also, that a portion of the product is not soluble in ether, and that, after evaporation of the ethereal solution, a portion of the residue only is soluble in alcohol. This indicates a product of complex composition. I hope somebody besides myself will take up the matter and make a thorough investigation.

The Chair then called for the nomination of officers for the ensuing year.

Mr. Hallberg, seconded by Mr. Dohme, nominated Mr. Chas. E. Caspari, of St. Louis, for Chairman, but Mr. Caspari said that, while he appreciated the compliment, he felt impelled to decline, and himself put in nomination for Chairman Mr. E. H. Gane, of New York City. He said he thought it would be a good precedent to establish to nominate for the Chairmanship the man who had served as Secretary for the preceding year, and he thought it was particularly appropriate at this time. Mr. Kirchgessner seconded Mr. Gane's nomination, and Mr. Wilbert, in moving to proceed to nominations for Secretary, placed Mr. Caspari's name before the Section for that place, which motion Mr. Hallberg seconded. Mr. Caspari said this placed him in rather a peculiar position, considering the remarks he had just made, and disclaimed any expectation of such a turn of affairs. The nomination stood, however, and the Section proceeded to the next order.

The Chair stated that the first paper on the program was one by Prof. Schmidt, of Marburg, Germany, which had been sent in July to a former scholar of his to translate, but, though he had repeatedly promised to send the translation, it had not been received, and it seemed that the proper thing to do was to receive the paper and order it published in the Proceedings. This suggestion had a second in Mr. Wilbert and was adopted.*

At request of the Chair, Mr. E. H. Gane then presented in abstract the following paper on cascara, by Dr. Jowett, of London:

CHEMICAL EXAMINATION OF CASCARA BARK.

BY H. A. D. JOWETT, D. SC.

Senior Research Chemist in The Wellcome Chemical Research Laboratories, London.

Although it is about twenty-six years since cascara sagrada was intro-

* Prof. Schmidt's paper not having been received up to November 17, 1904, it will appear at end of the Minutes of the Section on Scientific Papers.—*The General Secretary.*

duced into medicine, our knowledge of the chemistry of this drug is still in a most confused and unsatisfactory condition, and this confusion is increased rather than diminished by reference to the memoirs on the subject. The object of the present investigation was to endeavor to remove this confusion, so far as possible, by a critical review of the literature on the subject, and by repeating the work of previous investigators, as also by a complete chemical examination of genuine barks of known origin.

The first chemical examination of the bark was made by Prescott,* who isolated from *Rhamnus purshianus* a crystalline substance and three resins, besides certain constituents common to most barks, such as a volatile and fatty oil, oxalic and tannic acids, wax, starch, etc. The crystalline substance was obtained from the lead acetate precipitate by decomposing the latter with hydrogen sulphide, and was stated to crystallize from its alcoholic solution in white, double pyramids. It melted and sublimed at a temperature a little above 100° C., was sparingly soluble in petroleum ether, ether, chloroform, or alcohol, but was soluble in benzene. It was neutral to test paper. It was not analyzed, and its description, as given above, affords no clue to its identity. It has not been observed by subsequent investigators, and working by the method detailed by Prescott, I have been unable to obtain any substance of corresponding characters.

Limousin † considered that the resins obtained by Prescott ‡ were derived from chrysophanic acid, which he believed to be present in notable quantity. The experimental evidence for this statement was the fact that the grated surface of the bark was colored red when moistened with potassium hydrate solution or aqueous ammonia. As chrysophanic acid does not yield a red color with ammonia, Limousin's deduction is obviously incorrect, but the reactions above mentioned are characteristic of emodin, which, as will be shown later, is certainly present in the bark. Wenzell § isolated from the bark a small quantity of an orange-red, crystalline substance, melting at 226–230° C., and having the properties of a glucoside. He considered that it was not identical with either frangulin or emodin. No indication was given in the paper of the purity of this substance, and later investigators have shown that it was impure emodin. Meier and Webber || stated that, after an exhaustive examination of the drug, they found a ferment, glucose, and a trace of ammonia, and that the glucoside may be separated by precipitating an aqueous infusion with lead subacetate. As this paper contains no experimental evidence of the identity of the above constituents, it requires no further comment. It

* Amer. Journ. Pharm., 1879, 51, 165.

† Journ. de Pharm. et de Chim., 1885 (V), VI, 80.

‡ Loc. cit.

§ Pharm. Rundschau, 1886, 4, 79.

|| Amer. Journ. Pharm., 1888, 60, 87.

contains, however, the first reference I have been able to find respecting the griping alleged to be caused by the use of immature bark, and it will be convenient to deal with this point in this part of the paper. Meier and Webber refer to papers by Baildon * and by Lamm and Fristedt † as authority for the statement that cascara bark when fresh gives rise to a griping action which is not produced by the mature bark. Reference to these papers shows, however, that they contain opposite and contradictory statements, Baildon stating that the bark was "a gentle aperient without griping," whilst Lamm and Fristedt observed griping effects, but in both cases *Rhamnus frangula* and not *purshianus* was referred to.

Moreover it has been stated ‡ that "to obtain the best results, the bark (*Rhamnus purshianus*) must be of comparatively recent collection." Meier and Webber state that fresh cascara bark contains a ferment which seemed to be identical with that existing in cabbage, licorice root, and other vegetables, and that in the stomach this ferment forms lactic acid, which causes the griping. In opposition to this it is now known that the formation of lactic acid is due, not to the action of a vegetable ferment, but to the lactic acid bacillus (*B. acidi lactici*), and this explanation of the griping action of the drug must therefore be abandoned.

Moss and Jardine § examined the therapeutic effect of barks of known origin, collected at different seasons of the year, from different localities, and of different age, but their results were somewhat contradictory. In the summary Jardine stated: "With the exception of fluid extract of bark collected in the spring of 1890, I could not distinguish much difference in one extract from another." That collected in the spring of 1890 showed a marked griping action, but that of more recent collection, August 1890, did not. It is clear, therefore, that these results do not prove that the griping action is due to the use of immature bark.

Schwabe || examined *Rhamnus purshianus* and found emodin, identical with that obtained from *Rhamnus frangula*, to exist as such in the bark, and identified it by means of its acetyl and dibromo compounds, all of which were analyzed. He considered that Wenzell's crystals, previously referred to, were merely impure emodin, and could obtain no evidence of the existence of a glucoside, nor could he isolate any other crystalline substance.

Zeig ¶ further examined the resins previously described by Prescott, but was unable to isolate any definite principle.

* Year Book of Pharmacy, 1871, 560.

† Zeit. Oesterr. Apoth. Ver., 1876, 156.

‡ Year Book of Pharmacy, 1886, 168.

§ Year Book of Pharmacy, 1891, pp. 476, 482.

|| Arch. Pharm., 1888, 226, 569.

¶ Proc. Amer. Pharm. Assoc., 1889, 37, 261.

La Prince* claimed to have obtained the active principle of cascara bark in a crystalline form. It was stated to have been prepared by extracting the bark by boiling with an aqueous solution of sodium carbonate, neutralizing the strained decoction with acid, filtering, and evaporating the filtrate to dryness in a vacuum. The residue was extracted with acetone, the acetone solution acidulated with sulphuric acid, and then poured into a large excess of water. The yellow, crystalline deposit which separated was purified by a repetition of the above process. This substance, which he named *Cascarine*, formed microscopic, prismatic needles, which darkened at 200° C. and melted at 300° C. with decomposition. It was tasteless, insoluble in water, and dissolved in alkalies with the formation of a purple red color. It gave on analysis numbers agreeing with the formula $C_{12}H_{10}O_5$, but the analytical details were not given. When fused with potassium hydroxide a small amount of a substance was formed which he considered might be phloroglucinol. Finally Le Prince suggested that cascarine may be identical with rhamnetin.

A most curious confusion has arisen in chemical literature with respect to this substance. Beilstein, under cascarine,† queries it as identical with rhamnetin, but Phipson‡ considered that it was identical with xanthorhamnin, and Van Rijn,§ without comment, accepts this latter conjecture, and under xanthorhamnin gives the details of Le Prince's preparation of cascarine from cascara.

The properties of cascarine, as given by Le Prince, prove that it could *not* be identical with either rhamnetin or xanthorhamnin, and this is clearly shown in the following table :

Property.	Cascarine.	Rhamnetin.	Xanthorhamnin.	Emodin.
Composition	$C_{12}H_{10}O_5$.	$C_{16}H_{12}O_7$.	$C_{40}H_{66}O_{29}$.	$C_{15}H_{10}O_5$.
Melting-point	300° C.	—	—	256° C.
Solubility in water . .	Insoluble.	Insoluble.	Extremely easily soluble.	Insoluble
Color with alkalies . .	Purple red.	Yellow.	Yellow.	Purple-red.

Le Prince presents no evidence of the purity of cascarine, and it agrees in properties, with the exception of the melting point, with emodin. Furthermore, by the method of preparation adopted, the resulting product would almost certainly contain emodin. It is, therefore, exceedingly

* Compt. rend., 1892, 115, 286.

† Handbuch, 3d ed., iii, 627.

‡ Compt. rend., 1892, 115, 474.

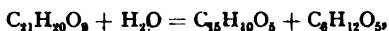
§ "Die Glykoside," 1900 ed., 299.

probable that the cascara of Le Prince was nothing more nor less than impure emodin. Le Prince's experiments have been carefully repeated, but, as will be shown later, it has not been possible to isolate any substance agreeing in properties with cascara.

Dohme and Engelhardt * examined *Rhamnus purshianus*, and claimed to have isolated the active principle of the drug, which they named *Purshianin*. This was stated to be a glucoside, yielding on hydrolysis emodin, and a sugar which was not identified. Before dealing with this substance there are some other points in this paper to which attention may be directed.

In the first place Schwabe's results are incorrectly recorded by them, since in a pamphlet entitled "The History, Pharmacognosy and Chemistry of Cascara Sagrada," p. 3, they make the following statement: "He (*i. e.*, Schwabe) unquestionably errs as far as buckthorn is concerned, as Lieberman and Thorpe each actually obtained frangulin, a glucoside melting at 225° C., from buckthorn, and from this frangulin, by saponification, emodin."

Schwabe,† as a matter of fact, found both frangulin and emodin in buckthorn bark (*Rhamnus frangula*), and, as evidence of this, the concluding sentence of Thorpe's last paper may be quoted: ‡ "We conclude, therefore, that there can no longer be any doubt that the formula $C_{21}H_{20}O_8$, which was first assigned to frangulin by Schwabe, is correct, and that his equation,



truly represents its hydrolysis."

Thorpe and Miller also found emodin in frangula bark, in addition to frangulin, thus confirming Schwabe's statements. Dohme and Engelhardt also state: § "The investigations of the author (Dohme) and Dr. Engelhardt of this laboratory, as given in detail below, also show that Schwabe erred as far as cascara is concerned, for they obtained from it not emodin as a first product, but a glucoside melting at 237° C., crystallizing in dark, red-brown needles, which they named purshianin, and which on saponification by treatment with dilute acids yielded emodin and a sugar."

Schwabe's results, already referred to, are quite conclusive with regard to the identification of emodin, and no experimental evidence is offered by Dohme and Engelhardt in support of their assumption that emodin is not present in cascara. Moreover, Schwabe's results have been confirmed by Le Prince || and by the author, and the experimental details, given in another part of this paper, show that emodin can be extracted directly

* Proc. Amer. Pharm. Assoc., 1897, 45, 193.

† *Loc. cit.*

‡ Thorpe and Miller, *J. C. S.*, 1892, 61.

§ Pamphlet, p. 3.

|| Compt. rend., 1899, 129, 60.

from cascara bark by benzene, thus avoiding all possibility of hydrolysis. In fact, part of the emodin used by the author in another investigation * was prepared in this way directly from cascara bark.

Dohme and Engelhardt examined the fatty oil of cascara, and considered it to consist of a mixture of dodecyl palmitate and stearate. † The evidence of the identity of dodecyl alcohol seems fairly conclusive, although the purity of the substance melting at 24° – 26° C., and subsequently analyzed was not assured. On the other hand, the evidence of the identity of the fatty acids with palmitic and stearic acids is very inconclusive, and the authors themselves admit that this point cannot be considered definitely settled.

The most important part of Dohme and Englehardt's paper is, however, their statement that cascara does not contain emodin, but a glucoside, purshianin, yielding emodin on hydrolysis, and that this is the active principle of the drug.

I shall proceed to deal somewhat in detail with the evidence adduced for the existence of this glucoside. It was prepared by extracting the drug, first with chloroform, to remove fat, etc., and then with 80 per cent. alcohol. After distilling off the alcohol, the residual extract was dissolved in water and precipitated with lead subacetate. The latter precipitate was then decomposed by hydrogen sulphide, and the filtrate from the lead sulphide evaporated. In this way a hard brown-red substance was obtained, which, they state, "is very difficult to obtain in a crystalline form, as efforts to crystallize it from acetone and ethyl acetate resulted only in our obtaining a few dark brown-red needles, melting at 237° C., the most of it separating in an amorphous condition. Not sufficient of it was obtained to make an analysis, but we could confirm that it was not emodin, as it gave no purple color on being treated with caustic potash. It is the glucoside of cascara sagrada."

It will be observed that no proof was given of the purity of the crystals (m. p. 237° C.), and the substance used for hydrolysis was apparently the amorphous product.

The entirely unwarranted assumption was made that this amorphous substance was homogeneous and identical with the crystals melting at 237° C. If this had been the case, the greater part of it would undoubtedly have crystallized. From a consideration of the work of previous investigators, it would appear likely that these crystals were impure emodin, but it is stated that they were not emodin because they gave no purple color with caustic potash. The actual color reaction obtained is not stated, but it would be expected that the impurity present might modify this color reaction to some extent. Indeed, a few lines further on they state that

* Jowett and Potter, *J. C. S.*, 1903, 83, 1327.

† *Loc. cit.*, p. 197.

emodin gives a blood-red color with caustic alkali. There is, therefore, no evidence whatever adduced to show that these crystals were not impure emodin, nor is any proof furnished of the glucosidal character of this substance. No tests for the presence of sugar previous to the hydrolysis are recorded, and it is difficult to see on what basis the assumption rests that the sugar afterwards found was produced by the hydrolysis of the amorphous substance. Finally, with regard to the emodin isolated, there is no proof that it was not present as such in the original substance, as only a portion may have crystallized out owing to the presence of other substances which prevented crystallization. By treatment with acid these associated substances might have undergone change, so that the emodin was then more easily isolated. Experimental evidence of the correctness of this explanation will be found in a later portion of this paper. It is clear that no experimental evidence has been adduced to prove the existence of purshianin.

Dohme and Engelhardt also attempted to obtain the bitter principle in a crystalline form, but were unsuccessful.

Le Prince* stated that he had isolated from the bark, emodin, chrysophanic acid, and chrysarobin. The evidence which he adduced of the presence of the two latter substances is by no means conclusive. The chrysarobin was stated to have been extracted from a crude product by a small quantity of acetic acid, and its melting-point was given as 165° – 170° C., but it was not analyzed. If this substance were chrysarobin it was evidently impure, as pure chrysarobin† is sparingly soluble in acetic acid, and melts at 204° C.

The chrysophanic acid was separated by Le Prince by using a larger volume of acetic acid. It was found to melt at 160° – 162° C., gave the theoretically required figures on analysis, and dissolved completely in ammonia with a red coloration. Chrysophanic acid (*loc. cit.*), however, is known to melt at 190° C., and is insoluble in ammonia. Whilst these results indicate that substances allied to emodin were possibly present, their identity with chrysophanic acid and chrysarobin cannot be considered definitely established.

Aweng‡ has stated that the bark contains primary and secondary glucosides, yielding on hydrolysis, emodin, chrysophanic acid, and rhamnetin. As, however, he does not regard these glucosides as definite substances, and furnishes no experimental evidence to prove either their glucosidal nature or the identity of the products of hydrolysis, his results need not here be further considered.

Cascara contains a very small amount of a volatile oil, which has been

* Compt. rend., 1899, 129, 60.

† Jowett and Potter, *J. C. S.*, 1902, 81, 1577.

‡ Pharm. Centralhalle, 1898, 776; Apothek. Zeit., 1900, 15, 537; 1902, 17, 372.

examined,* but the amount present is so small that it would not appear to be of much importance as a constituent of the bark.

In view of the conflicting statements which have just been referred to, it may be advantageous to state concisely the results of the critical examination of the literature on this subject.

1. The only definite principle isolated from cascara bark, the identity of which can be considered to be absolutely established, is emodin.

2. The statement of the existence in the bark of chrysophanic acid, chrysarobin, or glucosides yielding on hydrolysis emodin, chrysophanic acid or rhamnetin, is not supported by satisfactory experimental evidence.

3. Wenzell's "crystals," Le Prince's "cascarine," and Dohme and Engelhardt's "purshianin" would appear from the description given by the respective authors to be merely impure emodin.

4. No indication can be given of the identity of the crystals described by Prescott.

5. It has been stated by Dohme and Engelhardt that the fat of cascara consists of dodecyl palmitate and stearate.

In the course of the present detailed examination of the constituents of the bark, especial attention has been directed to the above points. Particular care has been taken to ensure the authenticity of the barks examined, and, where definite substances have been isolated, their purity has been established, wherever possible, by the usual chemical methods.

As the details of the experimental work are somewhat extended and are given in the second part of the paper, a summary of the results obtained may appropriately be inserted here, the following numbers corresponding with those employed in the above summary of previous work on the subject :

1. In addition to emodin, the presence of which in the bark was fully confirmed, there was isolated a small amount of a substance isomeric with emodin, melting at 183°C ., but insoluble in ammonia. It may be identical with the iso-emodin obtained by Thorpe and Miller from frangula bark.† Its acetyl derivative melted at 168°C .

Glucose was also proved to occur in the bark, and a substance which, on treatment with acid, yielded syringic acid. It has been proved that the latter does not exist as such in the bark, but is formed by the action of acids. The nature of the compound yielding it could not be ascertained.

2. No evidence whatever could be obtained of the existence of chrysophanic acid or chrysarobin in the bark, or of glucosides yielding on hydrolysis emodin, chrysophanic acid or rhamnetin. A possible explanation of the results of previous observers would seem to be afforded by the peculiar behavior of emodin. It was found, for example, that emodin,

* Haensel, *Apoth. Zeit.*, 1901, 16, 754.

† J. C. S. 1892, 61, 6.

although insoluble in water, is soluble in the aqueous extract of the bark, and that it is extracted from such a solution only slowly and with difficulty by shaking with immiscible solvents such as benzene, ether or chloroform. On the other hand after treatment with acids, the water-soluble substances were decomposed with formation of insoluble resins, and the emodin was very readily extracted from such a mixture. This curious behavior, recalling that of the digitalis glucosides, might lead to the deduction that glucosides yielding emodin on hydrolysis were present. If, however, the aqueous extract is repeatedly shaken with chloroform or ether, to remove the greater part of the emodin, and then hydrolyzed, not more than traces of emodin will be found.

Schwabe's conclusions as to the presence of emodin and the absence of a glucoside yielding emodin on hydrolysis were thus completely confirmed.

3. On repeating the experiments of Le Prince and of Dohme and Englehardt it was not possible to isolate a pure substance corresponding to either cascarnine or purshianin. There is no doubt but that these represent impure products and not chemical entities.

4. The efforts to obtain the crystals described by Prescott were unsuccessful.

5. The bark contained about two per cent. of a fat which consisted of rhamnol arachidate, free arachidic acid, and substances, probably glycerides, yielding on hydrolysis linolic and myristic acids. The name *rhamnol* has been assigned to the alcohol, $C_{20}H_{34}O$ melting at 135° to 136° C., which is combined with arachidic acid in cascara, and is identical with an alcohol obtained from Kù-sam seeds by Power and Lees.* Its acetyl derivative melts at 117° C. Rhamnol belongs to the type of alcohols of which quebrachol (with which it is possibly identical) cupreol and cinchol are members.†

6. Attempts to obtain the bitter principle or derivatives of it in crystalline form were unsuccessful.

7. No difference could be observed between the chemical characters of the fresh (one year old) or of the so-called matured bark (3 years old).

8. Beyond slight differences in the amounts of extractive, etc., the examination of *Rhamnus purshianus* and of *Rhamnus californicus* gave identical results.

9. A hydrolytic enzyme was isolated which hydrolyzed amygdalin, but when administered in 1 gramme doses it had no griping action.

10. The physiological experiments made for the purpose of locating the active principle of the drug resulted as follows:

Emodin is *not* the active principle of the drug, and exerts very little influence, if any, on the characteristic aperient action of cascara.

The active principle or principles producing the aperient action of the

* Year Book of Pharmacy, 1903, p. 503.

† Beil. Handbuch, 3rd Edit., II, 1068.

drug are contained in that portion of the lead subacetate precipitate extracted by ethyl acetate (see page 17), and which is soluble in water and in alcohol.

No crystalline product could be isolated from this extract, and therefore no clue whatever could be obtained as to the chemical nature of the active principle.

EXPERIMENTAL.

The material used in this investigation, with the exception of specimen 2, was specially collected for the purpose under the supervision of a competent botanist. It consisted of:

1. *Rhamnus purshianus*. Bark collected in Oregon, on 10th September, 1902, and its chemical examination commenced early in 1903.

2. *Rhamnus purshianus*. A carefully selected commercial specimen which was known to be at least three years old.

3. *Rhamnus californicus*. Bark collected in California, in April and May, 1902.

EXAMINATION OF SPECIMEN 1.

Preliminary Experiments.

The powdered bark, after drying at 100°, gave on ignition, 4.3 per cent. of ash, and, after boiling four times successively with water, 32.5 per cent. of dried aqueous extractive.

A determination of tannin by the usual method showed that 2.4 per cent. was absorbed by hide powder.

When extracted successively with the under-mentioned solvents in a Soxhlet apparatus, the bark yielded the following amounts of extract, dried at 100° C. until of constant weight:

- | | |
|---------------------------------|------------------|
| (1) Petroleum (b. p. 40–50° C.) | = 2.0 per cent. |
| (2) Benzene | = 1.2 per cent. |
| (3) Ethyl acetate | = 23.9 per cent. |
| (4) Alcohol | = 6.3 per cent. |

The petroleum extract, which was a brownish-yellow, soft fat, was boiled with a small quantity of alcohol and filtered; the filtrate, on standing, deposited no crystals. The residual fatty matter, left after extraction with alcohol, was digested with a five per cent. cold aqueous solution of potassium hydroxide, and filtered. The filtrate, which was only slightly colored, was acidified, and the acid liquid extracted with petroleum. On removing the petroleum, no appreciable residue remained. There was, therefore, no appreciable amount of chrysarobin or chrysophanic acid present.

The benzene extract was of a dark-red color, and when dissolved in glacial acetic acid yielded emodin (m. p. 250° C.).

The ethyl acetate and alcoholic extracts also had a dark-red color, and showed no tendency to crystallize.

Isolation of a hydrolytic enzyme. The bark was cut into small pieces,

digested with cold water for two days, and then strained. The dark-brown filtrate became turbid on boiling, and gave a slight reaction with the usual alkaloidal reagents. To this aqueous liquid twice its volume of alcohol was added, and the precipitate collected and dried. The yield varied a little in different experiments, but averaged about 1 per cent. of the bark taken. The product was soluble in water, but gave no reaction with the usual alkaloidal reagents.

When a small portion was added to a solution of amygdalin, and allowed to stand at the ordinary temperature for a few hours, the odor of benzaldehyde was developed, thus proving the presence of a hydrolytic enzyme.

Separation of the Constituents of the Bark.

In order to effect a preliminary separation of the constituents of the bark, the following procedure was adopted. The powdered bark was thoroughly extracted with hot alcohol in a reflux apparatus and the alcohol removed by distillation. The resulting dried extract was a dark-brown hygroscopic mass, and amounted to 33.3 per cent. of the bark taken. About five kilos of the extract were mixed with a large volume of water, when a quantity of a dark-brown fatty substance separated (subsequently referred to as A). This was filtered off with some difficulty, and the filtrate extracted by shaking many times with chloroform. It was evident that the last traces of emodin or allied substance were removed very slowly, as the chloroform extract, even after 40 extractions, still gave a very slight coloration to the aqueous layer when shaken with ammonia. The liquid, after extraction with chloroform, was first precipitated with lead acetate solution, when a dirty-colored precipitate was thrown down; this was separated, and the filtrate precipitated with lead subacetate solution, when a very voluminous brick-red precipitate was produced, which was filtered off, and the filtrate freed from lead by hydrogen sulphide.

The fatty substance (A) was next thoroughly extracted with boiling petroleum, when, after distillation, a brown, fatty mass was obtained. The portion remaining undissolved by the petroleum was dissolved in alcohol, the alcohol distilled off, and the concentrated extract poured into a large volume of water. The resin which separated was collected, washed, and dried.

By this treatment the original alcoholic extract was resolved into the following portions, which were further examined :

1. Petroleum extract, chiefly fat.
2. Resin.
3. Chloroformic extract.
4. Lead acetate precipitate.
5. Lead subacetate precipitate.
6. Filtrate from lead subacetate precipitate.

The residual marc, left after extraction with alcohol, was boiled with

water, when a dark-brown extract was obtained, which, when evaporated, formed an almost black, amorphous residue. The aqueous solution was tasteless, did not reduce Fehling's solution, and was not further examined.

1. Examination of the Petroleum Extract.

The dark-brown, fatty mass was dissolved in alcohol, and hydrolyzed with alcoholic potassium hydroxide, on the addition of which it formed a red solution. After hydrolysis the alcohol was distilled off, and the residue mixed with sand, dried, and extracted in a Soxhlet apparatus with ether.

Neutral Constituents of the Fat.

The ethereal solution, on distillation, left a residue which quickly became crystalline, and after one crystallization from alcohol melted at 131°C . It was then recrystallized, first from alcohol, and subsequently from glacial acetic acid, until of constant melting-point. It was thus obtained in white needles, melting at $135^{\circ}\text{--}136^{\circ}\text{C}$. It was sparingly soluble in petroleum, cold acetone, alcohol, water, or glacial acetic acid, but readily soluble in ether, chloroform, benzene, hot acetone, alcohol or glacial acetic acid.

On analysis:

0.0824 gave 0.248 CO_2 and 0.0892 H_2O . $\text{C} = 82.1$; $\text{H} = 12.0$.

$\text{C}_{20}\text{H}_{34}\text{O}$ requires $\text{C} = 82.8$; $\text{H} = 11.7$ per cent.

When a small amount of the substance was dissolved in a little chloroform, a few drops of acetic anhydride added, and subsequently one drop of sulphuric acid introduced, a transient rose color was produced, changing successively to blue, green, and, on long standing, to brown.

When mixed with an equal quantity of the alcohol obtained from Kô-sam seeds by Power and Lees (*loc. cit.*), the melting-point was unchanged. As these two alcohols are therefore identical, on consultation with these authors it has been decided to designate it *rhamnol*, with reference to its isolation from *Rhamnus purshianus*. A determination of its specific rotation in chloroform gave the following result:

$$\alpha_{\text{D}}^{22^{\circ}\text{C}} = -1^{\circ} 20'; c = 4.296; l = 1 \text{ dm.}; [\alpha]_{\text{D}}^{22^{\circ}\text{C}} = -31^{\circ}.$$

Power and Lees found $[\alpha]_{\text{D}}^{23^{\circ}\text{C}} = -37.7^{\circ}$.

The acetyl compound was prepared by acetylation with acetic anhydride and sodium acetate, and, after recrystallization from alcohol, melted at 117°C .

On analysis:

0.2002 gave 0.5896 CO_2 and 0.2020 H_2O . $\text{C} = 80.3$; $\text{H} = 11.2$.

$\text{C}_{27}\text{H}_{40}\text{O}_2$ requires $\text{C} = 80.0$; $\text{H} = 10.9$ per cent.

Rhamnol is isomeric with, and appears to be closely related to, quebrachol, cupreol and cinchol. It differs only in melting-point from quebrachol, with which it is possibly identical, but until this point can be definitely settled it will be designated as rhamnol.

As already stated, the ethereal extract, after one crystallization from alcohol, melted at 131°C. , and as the melting-point after repeated crystallization could only be raised to 135° – 136°C. , it was clear that only a very small quantity of an impurity could be present.

The mother-liquors from the rhamnol were concentrated and carefully searched for any other substances, but without success. The residue from these mother-liquors was therefore converted into the acetate, as much as possible of the rhamnol acetate allowed to crystallize out, and the mother-liquors then hydrolyzed. Finally, a very small amount of an oily residue was obtained, from which on long standing a few crystals separated, which melted at 80° – 90°C. indefinitely, and were evidently impure. The only neutral substance thus isolated was rhamnol.

No indication could be obtained of the existence of dodecyl alcohol, stated to have been isolated from the fat by Dohme and Engelhardt (*loc. cit.*).

Acid Constituents of the Fat.

The potassium soap, after extraction with ether, was next dissolved in water and acidified with sulphuric acid, when a precipitate was produced. The whole was then steam distilled. The acid distillate was neutralized by digestion with barium carbonate, filtered, and the aqueous solution of the barium salt evaporated to dryness. A small amount of a crystalline residue was obtained which quickly reduced silver nitrate, and when warmed with mercuric chloride in acid solution yielded calomel. The volatile acid therefore contained *formic acid*. The acid liquid remaining after the steam distillation was extracted with petroleum, and the latter removed by distillation. The residue, which was a thick, almost colorless oil, on standing partly solidified. The crystals were filtered off, drained on a porous tile and crystallized, first from alcohol, and then from glacial acetic acid until of constant melting-point. The pure acid, thus obtained in white acicular crystals, melted at 75°C.

On analysis :

0.1192 gave 0.3352 CO_2 , and 0.141 H_2O . $\text{C} = 76.7$; $\text{H} = 13.1$.

Arachidic acid, $\text{C}_{20}\text{H}_{40}\text{O}_2$, requires $\text{C} = 76.9$; $\text{H} = 12.8$ per cent.

The substance was therefore *arachidic acid*.

The oily acids, from which as much arachidic acid as possible had been separated, and which decolorized bromine in the cold, were converted into the lead salts by heating with excess of lead carbonate and a little water. This product was dried and extracted with ether, the ether soluble and insoluble portions respectively treated with excess of dilute hydrochloric acid, the liberated fatty acids extracted with ether, again converted into lead salts and extracted with ether, and the acids regenerated as before.

The acids from the lead salts insoluble in ether were obtained as an amorphous mass melting at 48°C. , and could not be crystallized from alcohol, as they separated in the form of a jelly.

When dissolved in chloroform and allowed to stand, crystals separated, which, after recrystallization from glacial acetic acid, melted at 74° – 75° C., and were therefore arachidic acid.

The chloroform mother-liquor was then evaporated to dryness, and the residue crystallized from glacial acetic acid, when crystals were obtained melting at 64° C., but after recrystallization at 70° C. The final glacial acetic acid mother-liquor was precipitated with water, and the precipitate collected and dried.

It melted at 51 – 52° C., and on analysis :

0.1072 gave 0.292 CO_2 and 0.118 H_2O . $\text{C} = 74.3$; $\text{H} = 12.2$.

Myristic acid, $\text{C}_{14}\text{H}_{28}\text{O}_2$, requires $\text{C} = 73.7$; $\text{H} = 12.3$ per cent.

Myristic acid melts at 54° C., and the melting-point and analytical numbers of the acid last obtained proves that the saturated fatty acid accompanying arachidic acid is, in all probability, myristic acid.

No evidence of the occurrence of palmitic or stearic acids, as indicated by Dohme and Engelhardt, could be obtained.

The acids from the lead salts soluble in ether formed an oily liquid which showed at first no tendency to crystallize, so they were fractionally distilled under 50 Mm. pressure. The following fractions were collected : (1) below 261° C., (2) 261° – 266° C., (3) above 266° C. These fractions were then separately examined.

Fraction 1. B. p. below 261° C. under 50 Mm.

This was a light-brown oil which, on standing, deposited a few crystals, but these were insufficient to admit of further examination. The oil had a distinct smell of linolic acid, and did not give the elaidic acid reaction with nitrous acid.

On analysis :

0.0978 gave 0.2658 CO_2 and 0.1056 H_2O . $\text{C} = 74.1$; $\text{H} = 12.0$.

0.4584 absorbed 0.52 iodine by Hübl's method. Iodine number = 113.4.

Fraction 2. B. p. 261° to 266° C. under 50 Mm.

This only showed a tendency to deposit crystals when exposed to a low temperature and after standing for some time. It was similar in appearance and physical properties to Fraction 1, and on analysis :

0.092 gave 0.2584 CO_2 and 0.0944 H_2O . $\text{C} = 76.6$; $\text{H} = 11.4$.

0.3734 absorbed 0.53 iodine by Hübl's method. Iodine number = 141.9.

Linolic acid, $\text{C}_{18}\text{H}_{32}\text{O}_2$, requires $\text{C} = 77.1$; $\text{H} = 11.4$ per cent. and iodine number = 181.4.

Fraction 3. B. p. above 266° C. under 50 Mm.

This was a darker-colored oil, which deposited a few crystals on standing, and on analysis :

0.1126 gave 0.313 CO_2 and 0.1134 H_2O . $\text{C} = 75.8$; $\text{H} = 11.2$.

0.4404 absorbed 0.61 iodine by Hübl's method. Iodine number = 138.5.

These results indicate that the chief constituent of the oily acids obtained from the ether soluble lead salts was linolic acid, but that small amounts of saturated acids and possibly of the oxidation products of linolic acid were also present.

The fatty oil isolated from cascara, on hydrolysis, therefore yielded *rhamnol*, $C_{20}H_{34}O$, an alcohol of the quebrachol type, identical with that previously isolated from Kô-sam seeds, together with *arachidic* and *linolic* acids and a small quantity of (probably) *myristic* acid. No evidence was obtained of the existence of any other acid or alcohol, or of chrysarobin and chrysophanic acid, which would have been extracted by petroleum and contained in the fatty oil examined.

2. The Resin.

This was a very dark brown powder which seemed to consist of two fractions, one being less soluble in alcohol than the other. These were therefore separated by extracting with a small quantity of hot alcohol, and pouring the alcoholic solution into excess of water. As, however, the subsequent chemical examination revealed no difference in behavior between the two fractions, the details of the examination of one will suffice.

The powdered resin was extracted in a Soxhlet apparatus with ether, chloroform and alcohol, successively.

The *ether extract* was a brownish syrup which deposited crystals on standing. It was dissolved in glacial acetic acid, and from this solution crystals separated which melted at $250^{\circ}C$., were completely soluble in dilute ammonia with a characteristic purplish-red coloration, and were therefore emodin.

The mother-liquors gave, on long standing, some more emodin, and, on adding water, a black, resinous precipitate, from which nothing definite could be isolated.

The *chloroform extract* gave a very small residue from which no definite product could be separated.

The *alcoholic extract* was a very dark brown liquid which showed no tendency to crystallize. It was poured into water, and the precipitated resin collected and dried. It was then fused with five times its weight of potassium hydroxide, the fused mass dissolved in water, acidified with sulphuric acid, and extracted several times with ether. The ethereal extract was then washed with water and distilled. The residue, which became crystalline on standing, was drained on a porous tile, and the crystals recrystallized from hot water. They then melted at $193-194^{\circ}C$., and their aqueous solution gave with ferric chloride a dark green coloration, which, on the addition of a drop of sodium carbonate solution, turned to blood-red. The crystals were, therefore, protocatechuic acid. The resin was thus found to contain some emodin and amorphous substances from which protocatechuic acid was obtained by fusion with potassium hydroxide.

3. The Chloroformic Extract.

The chloroform was distilled off, and the residue, which was partly crystalline, was crystallized from glacial acetic acid. Fine, reddish-brown, acicular crystals were thus obtained, which melted at $250^{\circ}\text{C}.$, and, with ammonia, gave the characteristic emodin reaction. On analysis:

0.1616 gave 0.3896 CO_2 and 0.0604 H_2O . $\text{C} = 65.8$; $\text{H} = 4.1$.

Emodin, $\text{C}_{15}\text{H}_{10}\text{O}_5$, requires $\text{C} = 66.6$; $\text{H} = 3.7$ per cent.

From the mother-liquors, after concentration and long standing, a further quantity of emodin was obtained. When no more crystals could be obtained, a large excess of water was added to the mother-liquors, and the dark yellow precipitate formed filtered off, dried, mixed with sand, and extracted in a Soxhlet apparatus, successively, with (i) petroleum, (ii) ether, and (iii) benzene.

The *petroleum extract* was distilled and the brick-red crystalline residue recrystallized from ethyl acetate, when a very small quantity of crystals was obtained, which, after further recrystallization from benzene, melted at $200^{\circ}\text{C}.$, and were insoluble in ammonia, but gave a faint red coloration with potassium hydroxide. The amount obtained was insufficient for analysis, but its general characters leave little doubt that it was an anthraquinone derivative allied to emodin, chrysophanic acid, etc. The mother-liquors were worked up, the resulting product freed from emodin by ammonia, and the insoluble portion acetylated. The acetyl compound, after recrystallization from 90 per cent. alcohol, melted at $155^{\circ}\text{C}.$ Although it was not possible to identify this substance, it was quite evident that it was not chrysarobin, which melts at $200^{\circ}\text{C}.$, gives no coloration with ammonia, a yellow solution with potassium hydroxide, and an acetyl derivative melting at $234^{\circ}\text{C}.$

The *ether extract* was distilled, and the residue dissolved in hot 90 per cent. alcohol. On cooling, crystals separated which melted at $180^{\circ}\text{C}.$ These were freed from traces of emodin by dissolving in dilute ammonia and filtering; the insoluble portion, after recrystallization from several solvents, melted at $183^{\circ}\text{--}184^{\circ}\text{C}.$, and, on analysis:

0.0496 gave 0.1202 CO_2 and 0.0194 H_2O . $\text{C} = 66.1$; $\text{H} = 4.3$.

$\text{C}_{15}\text{H}_{10}\text{O}_5$ requires $\text{C} = 66.6$; $\text{H} = 3.7$ per cent.

The acetyl compound, prepared in the usual way with acetic anhydride and sodium acetate, was recrystallized from alcohol, and formed yellow, acicular crystals melting at $168^{\circ}\text{C}.$ This substance agrees best in its properties with an isomer of emodin isolated by Thorpe and Miller from *R. frangula*.*

The *benzene extract* on distillation left a residue which was too small to admit of further examination.

The examination of the chloroform extract had therefore shown that it

* *J. C. S.*, 1892, 61, 6.

contained emodin, an isomer of emodin, an anthraquinone derivative melting at 200° C. but not identified, and, furthermore, that no chrysarobin or chrysophanic acid could be isolated from it.

4. *The Lead Acetate Precipitate.*

The precipitate, after washing with water, was suspended in a little water, and the lead removed by hydrogen sulphide. After filtering off the lead sulphide, the aqueous liquid, which was light-brown in color, was concentrated by evaporation in a vacuum, during which process a large quantity of a black resin separated, which was filtered off. The concentrated filtrate was allowed to stand, when it slowly deposited a very small quantity of colorless crystals, which were found to consist of calcium sulphate. As no more crystals separated, but after spontaneous evaporation a hard resinous mass was obtained, this residue was dissolved in a small quantity of water and shaken several times with ether, and subsequently with benzene.

The *etheral extract*, on evaporation, gave a very small amount of a dark-red crystalline residue, which, on further examination, was found to consist chiefly of emodin.

The *benzene extract* was so small that it was not further examined. The aqueous liquid, after extraction with benzene, was evaporated to dryness with sawdust, and the residue extracted in a Soxhlet apparatus with (1) ethyl acetate, (2) acetone, (3) alcohol, and finally (4) with water.

The *ethyl acetate extract* gave, after removal of the solvent, a small amount of a brown, syrupy residue, which showed no tendency to crystallize. A portion, dried in a vacuum over sulphuric acid, formed a sticky, very hygroscopic mass, sparingly soluble in ethyl acetate or alcohol, but readily soluble in water. Its aqueous solution gave a red coloration with ammonia, a dark-brown one with ferric chloride, reduced Fehling's solution abundantly, and remained clear on the addition of acid, but became cloudy on boiling the acid solution. No crystals could be isolated from it.

The *acetone extract* gave a very small residue, and its aqueous solution afforded reactions similar to those of the ethyl acetate extract.

The *alcoholic extract* was very dark colored, and gave no crystals. Its aqueous solution was colored deep-brown with ferric chloride, deep-red with ammonia, and only slightly reduced Fehling's solution.

The *aqueous extract* gave only very slight reactions with the above-mentioned reagents.

As nothing crystalline could be isolated from the ethyl acetate, acetone or alcoholic extracts, they were mixed in aqueous solution and allowed to evaporate spontaneously. No crystals, however, separated, and the residue was therefore dissolved in alcohol and heated with a little sulphuric acid in a reflux apparatus. The alcohol was distilled off, the residue poured into a large volume of water, and filtered.

The precipitate and filtrate will be designated A and B respectively. The precipitate, A, after drying, was obtained as a dark-brown, resinous powder, which was extracted in a Soxhlet apparatus with petroleum, ether, chloroform and alcohol successively.

The *petroleum extract* was too small to admit of further examination.

The *etheral extract* gave, on distillation, a dark-brown residue, which was dissolved in hot glacial acetic acid. On long standing, a few crystals of emodin separated, but the amount was very small, considerably less than 1 per cent. of the product taken.

The *chloroform extract* left a dark, amorphous residue, from which nothing crystalline could be separated.

The *alcoholic extract* was similar in character to the chloroform extract.

The two latter residues were mixed and fused with potassium hydroxide, but the only definite principle that could be isolated was a very small amount of protocathechuic acid (m. p. 193° – 194° C.).

The filtrate (B) was extracted several times with ether, and the ether distilled off. The residue consisted of crystals mixed with a small amount of a red oil, insoluble in water. The crystals were separated, and recrystallized twice from water, when they melted at 204° – 205° C.; they proved to be identical with those obtained from the filtrate from the lead subacetate precipitate, and were therefore syringic acid (3.5 dimethylether of gallic acid).

The only definite product isolated directly from the lead acetate precipitate was, therefore, emodin.

After treatment with acid, a further trace of emodin and some syringic acid was isolated, but no other definite product. No clue was obtained as to the source of the syringic acid, and the fact that the product, before hydrolysis, contained substances which reduced Fehling's solution, rendered it impossible to say whether a glucoside was present or not.

With regard to the small amount of emodin found after treatment with acid, and in consideration of the difficulty in completely extracting it from the accompanying substances, it must be concluded that it was not formed by the acid treatment but pre-existed as such. There is, therefore, no evidence that the lead acetate precipitate contained a glucoside yielding emodin on hydrolysis.

5. The Lead Subacetate Precipitate.

The bulky red precipitate was well washed with water and decomposed with hydrogen sulphide in the usual manner. The filtrate from the lead sulphide was a very dark brown liquid, and was concentrated by evaporation in a vacuum. The syrupy extract obtained showed no tendency to crystallize, even after long standing. It was, therefore, thoroughly extracted, first with ether, and then with benzene.

The *etheral extract* was distilled, and the residue gave a small amount of emodin.

The *benzene extract* was too small to admit of further examination. The residue, after extraction with ether and benzene, was mixed with sawdust, evaporated to dryness, and extracted in a Soxhlet apparatus successively with ethyl acetate, acetone, alcohol and water.

The *ethyl acetate extract* gave a dark-red residue, which, when dried in a vacuum over sulphuric acid, was found to be sparingly soluble in ethyl acetate, but readily soluble in alcohol or water. Despite numerous attempts, no crystals could be obtained.

The aqueous solution was colored dark-brown with ferric chloride, red with ammonia, and reduced Fehling's solution. The acid solution became turbid on boiling. As will be shown later, the active constituents of the drug appear to be contained in this extract.

The *acetone extract* gave a very small residue which was similar in all respects to that obtained from the ethyl acetate extract.

The *alcoholic extract* gave a dark red residue, and constituted the greater portion of the subacetate precipitate. It showed no signs of crystallizing, even on long standing, was readily soluble in water, and behaved in most respects like the ethyl acetate residue, except that it only slightly reduced Fehling's solution.

The *aqueous extract* afforded a very dark colored residue, which gave no coloration with either ferric chloride or ammonia, and only slightly reduced Fehling's solution. It gave a dirty black precipitate with lead subacetate, and was not further examined. As no crystals could be obtained, the ethyl acetate and alcoholic residues were separately treated with alcoholic hydrochloric acid in a reflux apparatus, the alcoholic solution poured into excess of water, and the dense, greenish-black precipitate produced in each case examined as follows:

1. *Ethyl acetate extract.* This precipitate was dried and extracted in a Soxhlet apparatus with petroleum, ether, benzene and alcohol, successively, but in no case could any crystals be obtained, even after solution of the respective residues in glacial acetic acid. No trace of emodin, chrysophanic acid, chrysarobin, or other crystalline substance was found. The residues were therefore collected and mixed with those from the alcoholic extract, and the combined residues fused with potassium hydroxide.

2. *Alcoholic extract.* This was treated in exactly the same way as the ethyl acetate extract, and from the petroleum residue a small amount of a crystalline substance was obtained which gave the emodin color reaction with ammonia. The crude crystals weighed less than 0.05 gramme, and in this case must be considered to have been present in the original extract, and not to have been formed by hydrolysis. The other extracts gave no trace of crystalline substance.

Fusion with potassium hydroxide. The mixed residues (1 and 2) were fused with five times their weight of potassium hydroxide, and from the

products of fusion a small amount of protocathechuic acid (m. p. $193^{\circ}\text{C}.$) was isolated. No other definite substance was obtained. The examination of the lead subacetate precipitate showed, therefore, that no crystalline product, or anything corresponding to Dohme and Engelhardt's purshianin, could be isolated from it, and that no evidence could be obtained of the existence of any glucoside yielding emodin or chrysophanic acid on hydrolysis.

6. The Filtrate from the Lead Subacetate Precipitate.

This was freed from lead by hydrogen sulphide in the usual manner, evaporated to a low bulk in a vacuum, and set aside. No crystals separated, even on long standing, and a thick, dark-colored syrup was obtained.

A portion of the liquid, decolorized with animal charcoal, when warmed with phenylhydrazine in acetic acid solution, yielded a crystalline osazone melting at $210^{\circ}\text{C}.$, which was therefore phenylglucosazone. The liquid thus contained a considerable quantity of glucose. It gave no coloration with ferric chloride, no precipitate with tannic acid, and when shaken with chloroform the chloroform extract gave an insignificant residue. As the liquid was very bitter, and considering that the bitter principle possibly possesses acidic characters,* it was mixed with magnesium oxide and filtered. The precipitate was well washed with water, dissolved in dilute sulphuric acid, neutralized with sodium hydroxide, and then evaporated to dryness on sawdust and extracted in a Soxhlet apparatus with alcohol. The alcoholic extract was distilled, and the residue again taken up with sawdust and extracted successively in a Soxhlet apparatus with ether, chloroform and alcohol. The ether and chloroform extracted a mere trace.

The alcoholic extract gave a dark-brown residue, which was exceedingly bitter. All attempts to obtain it in a crystalline condition were unsuccessful. It was, therefore, treated with 10 per cent. aqueous sulphuric acid in a reflux apparatus, when a dark resinous precipitate was formed. The filtrate from this precipitate was extracted with chloroform, which, after distillation, left a small amount of amorphous residue. This could not be crystallized, but its dilute aqueous solution was colored dark-brown with ferric chloride. No definite product could be isolated at any stage.

The filtrate from the magnesia, in which the bitter taste was less pronounced, gave a very slight coloration with ferric chloride, and no coloration with ammonia.

It was treated with 10 per cent. aqueous sulphuric acid in a reflux apparatus, when a tarry mass was formed. This was filtered off, and the filtrate extracted with chloroform. The chloroform, after distillation, left a brownish residue, which became crystalline on standing. It was drained on a porous tile, and recrystallized first from glacial acetic acid, and then from water, until its melting-point remained constant. It was thus ob-

* Cf. White and Robinson, Year-Book of Pharmacy, 1902, 420.

tained in white acicular crystals, melting at 206° C. (corr.), sparingly soluble in cold water or glacial acetic acid, but much more soluble in the hot solvents. Its aqueous solution was acid to test paper, gave with ferric chloride a brown coloration, and the crystals dissolved in sodium carbonate solution with effervescence, but were reprecipitated on addition of acid.

On combustion it sublimed, forming silky needles, and

0.1241 gave 0.248 CO_2 and 0.0564 H_2O . C = 54.5; H = 5.1.

Syringic acid, $\text{C}_9\text{H}_{10}\text{O}_6$ required C = 54.5; H = 5.0 per cent.

Nitric acid produced a deep-red color, soon changing to yellow. These characters and the analytical figures indicate that the substance was syringic acid (3.5 dimethyl ether of gallic acid), the melting-point of which has been recorded as 202° C.

It is evident that the syringic acid does not exist as such in the bark, but in a state of combination, the nature of which cannot be indicated.

The filtrate from the lead subacetate precipitate therefore contains glucose and a substance yielding syringic acid on hydrolysis.

EXAMINATION OF SPECIMEN 2. THE MATURED BARK.

The examination of the bark was conducted, with slight modifications in the same manner as specimen 1. Only the results and the details of the modifications employed will, therefore, be given. The bark gave 4.9 per cent. of ash and 26.4 per cent. of dried aqueous extract.

The tannin absorbed by hide powder was found to be 3.0 per cent. The amounts yielded to various solvents were as follows:

- | | |
|--|------------------|
| (1) Petroleum (b. p. 40° – 50° C.) | = 2.4 per cent. |
| (2) Benzene | = 1.5 per cent. |
| (3) Ethyl acetate | = 22.3 per cent. |
| (4) Alcohol | = 5.8 per cent. |

The petroleum extract when tested for chrysophanic acid or chrysarobin gave a negative result.

The benzene extract, after crystallization from glacial acetic acid, yielded emodin equal to 0.17 per cent. of bark taken. A considerable quantity of the bark was completely extracted with petroleum, the marc dried, and then extracted with benzene. These residues were further examined.

An aqueous extract of the bark was evaporated to dryness and then extracted with alcohol. The alcoholic extract was precipitated with lead acetate and subacetate, and examined as previously described.

1. *Petroleum Extract.*

The residue, after distillation, was dissolved in hot alcohol, when, on standing, colorless crystals separated, which by re-crystallization from alcohol were resolved into a crystalline portion and a gelatinous mass. The crystals, after recrystallization from glacial acetic acid, melted at 75° C., and, on analysis, proved to consist of arachidic acid:

0.088 gave 0.2478 CO_2 and 0.1026 H_2O . $\text{C} = 76.8$; $\text{H} = 12.9$.

Arachidic acid, $\text{C}_{20}\text{H}_{40}\text{O}_2$, requires $\text{C} = 76.9$; $\text{H} = 12.8$ per cent.

The gelatinous mass, which dried to a wax, was hydrolyzed with alcoholic potash and yielded rhamnol (m. p. 135°C .) and arachidic acid (m. p. 72°C .). The portion of the fat which separated out in a crystalline condition therefore consisted of arachidic acid and rhamnol arachidate.

No evidence of the presence of chrysophanic acid or chrysarobin could be obtained.

2. Benzene Extract.

This left a dark-brown, partly-crystalline residue, which was recrystallized from glacial acetic acid. The dark brownish-red crystals which separated melted at 257°C ., and on analysis:

0.1406 gave 0.344 CO_2 and 0.0512 H_2O . $\text{C} = 66.7$; $\text{H} = 0$.

Emodin, $\text{C}_{15}\text{H}_{10}\text{O}_5$, requires $\text{C} = 66.6$; $\text{H} = 3.7$ per cent.

The acetyl derivative, prepared in the usual way with acetic anhydride and sodium acetate, melted at 192°C .

As the mother-liquors would contain the greater portion of the chrysarobin or allied substances present in the bark, a special search was made for them. The glacial acetic acid mother-liquor was precipitated with water and the precipitate dried. It was completely soluble in cold sodium carbonate solution, and thus was free from chrysophanic acid or chrysarobin. Other methods were tried, but no evidence could be obtained of the presence of these substances.

3. The Alcoholic Extract.

The lead acetate precipitate was similar in character to that previously described, it yielded emodin, and, after hydrolysis, syringic acid (m. p. 205°C .), which was analyzed:

0.0264 gave 0.052 CO_2 and 0.0124 H_2O . $\text{C} = 53.7$; $\text{H} = 5.2$.

Syringic acid, $\text{C}_9\text{H}_{10}\text{O}_6$, requires $\text{C} = 54.5$; $\text{H} = 5.0$ per cent.

The lead subacetate precipitate yielded a little emodin, but, after hydrolysis, no trace of a crystalline product.

The filtrate from the lead subacetate precipitate gave a phenylglucosazone, melting at $207^\circ\text{--}208^\circ\text{C}$., and, after hydrolysis, some crystals of syringic acid.

The chemical examination of the fresh and mature bark of *R. purshianus*, therefore, revealed no points of difference.

EXAMINATION OF SPECIMEN 3. RHAMNUS CALIFORNICUS.

The examination of this bark was conducted in precisely the same manner as specimen 1, and therefore the results only of the examination need be given.

The bark gave 6.1 per cent. of ash and 28.2 per cent. of dried aqueous extractive.

The tannin absorbed by hide powder was found to be 3.9 per cent. The amounts yielded to various solvents were as follows :

- | | |
|-------------------------------------|------------------|
| (1) Petroleum (b. p. 40° to 50° C.) | = 1.0 per cent. |
| (2) Benzene | = 1.2 per cent. |
| (3) Ethyl Acetate | = 19.5 per cent. |
| (4) Alcohol | = 5.1 per cent. |

The petroleum extract when tested for chrysophanic acid or chrysarobin gave a negative result.

The alcoholic extract (1300 grammes taken) yielded the following products :

1. The fat was hydrolyzed and yielded rhamnol (m. p. 135° C.) and arachidic acid (m. p. 73° C.), together with other oily acids not further examined.

2. The resin was similar in character to that obtained from *R. purshianus*.

3. The chloroform extract was crystallized from glacial acetic acid, and yielded emodin, m.p. 250° C. The amount of crystalline emodin obtained was 0.13 per cent. of the extract taken. The mother-liquors were precipitated with water, but nothing definite could be isolated.

4. The extract from the lead acetate precipitate contained a little emodin, which was extracted by chloroform; the residual extract was hydrolyzed, and a very small amount of emodin (m. p. 250° C.) obtained (.001 per cent. of the extract taken), together with some syringic acid (m. p. 204° C.). No other definite product was isolated.

5. The lead subacetate precipitate behaved exactly like that previously described under *R. purshianus* (specimen 1).

6. The filtrate from the lead subacetate precipitate yielded an osazone melting at 208°–209° C., and therefore contained glucose. After hydrolysis with sulphuric acid and extraction with chloroform, a crystalline residue was obtained, which, after re-crystallization from water, formed colorless, acicular crystals, melting at 205° C. Their aqueous solution gave a brown coloration with ferric chloride, whilst the crystals afforded with nitric acid a red coloration, changing to yellow. The substance was, undoubtedly, syringic acid. There would, therefore, appear to be no difference between the constituents of *R. purshianus* and *R. californicus*. The slight difference observed in the amount of ash, extractives, etc., afforded by the two species, might occur in barks of the same species obtained under different conditions, and no importance should be attached to them.

REPETITION OF EXPERIMENTS OF CERTAIN PREVIOUS INVESTIGATORS.

Prescott's crystals. In order to determine, if possible, the nature of the crystals described by Prescott (*loc. cit.*) the experiment was carried out exactly according to his description. One hundred grammes of the powdered bark (specimen 1) were first extracted with ether, the marc then

extracted with alcohol, the alcoholic solution poured into water, filtered, and the filtrate precipitated with lead acetate solution. This precipitate was then suspended in absolute alcohol and decomposed by hydrogen sulphide, the lead sulphide filtered off, and the very dark-colored alcoholic filtrate allowed to evaporate spontaneously. The solution first deposited an amorphous, brown substance, which was separated, and on further concentration a brown, amorphous varnish was obtained. No crystals could be observed or isolated.

Le Prince's cascarine. Attention has already been directed (p. 292) to the probability of this substance consisting of impure emodin. The details of its preparation, as given by Le Prince in his original paper (*loc. cit.*), have therefore been carefully carried out on two separate quantities of material by the author, and also, independently, by another worker in the laboratories with the following result:

500 grams of the powdered bark (specimen 1) were extracted with a hot 10 per cent. aqueous solution of sodium carbonate, the mass strained, and the liquid neutralized with sulphuric acid. The neutral liquid was then evaporated to dryness in a vacuum and extracted with acetone. The acetone solution, which was somewhat dark-colored, was then concentrated by distillation, and the extract acidified with a little sulphuric acid and allowed to stand for six hours. It was then poured into a large volume of water and allowed to stand for 24 hours. A brownish-yellow, amorphous precipitate almost immediately separated, but even after standing it showed absolutely no trace of crystalline structure. It was filtered off and dried, and was then found to melt very indefinitely at about 190° C., not at 300° C. as stated by Le Prince. The yield of dried product was 1.1 grams or 0.22 per cent., and it was very similar in appearance and general properties to the resin previously described. Attempts to crystallize it from glacial acetic acid being unsuccessful, it was extracted with hot benzene, and the benzene solution distilled. The residue was dissolved in hot glacial acetic acid, and on standing it deposited a few crystals of emodin, identified by the melting-point and the color reaction with alkalis. The cascarine of Le Prince consisted, therefore, of resin with a very small amount of emodin, and the formation of protocathechuic acid by fusion of the resin with potassium hydroxide has already been noted (p. 302).

Le Prince's isolation of chrysophanic acid and chrysarobin. Although, as has already been stated, it was found impossible to obtain any indications of the existence of chrysarobin or chrysophanic acid in the bark, it was deemed of importance to repeat Le Prince's experiment in this connection.

500 grammes of the powdered bark were macerated with a five per cent. aqueous solution of sodium hydroxide, and the strained liquid precipitated with sulphuric acid. The precipitate was then dried and extracted in a Soxhlet apparatus with acetone, the acetone solution poured

into water, and the brownish-black precipitate collected and dried. This product was again subjected to extraction with acetone and subsequent precipitation with water. The amorphous, black residue was first extracted with a very small quantity of cold glacial acetic acid and filtered. The filtrate, which, according to Le Prince, should contain chrysarobin, deposited no crystals on standing. It was therefore poured into water, and the precipitate collected and dried. It was then digested with hot benzene, when only a small portion dissolved, and the benzene solution deposited no crystals on cooling and standing. A further extraction of the residue with hot ethyl acetate and subsequent filtration gave no crystalline product.

The residue, insoluble in a small quantity of cold glacial acetic acid, was treated with a large quantity of this solvent and filtered. The filtrate, which would contain any chrysophanic acid present in the drug, deposited no crystals on standing. It was poured into a larger quantity of water, the precipitate collected, dried and dissolved in hot 90 per cent. alcohol. On cooling the solution and allowing it to stand for several days, no trace of crystals was obtained.

The repetition of Le Prince's experiments, therefore, served only to confirm the results arrived at by the other methods, and proved that no chrysophanic acid or chrysarobin could be isolated from the bark.

PHYSIOLOGICAL EXPERIMENTS WITH PREPARATIONS OF THE BARK.

Experiments were first made to determine whether emodin is the active principle of the drug, or if it exerts any purgative action. For this purpose pure emodin was administered to several persons, but even in one grain doses, it was found to be quite inactive. As it was possible that, although inactive under the above conditions, it might be active when associated with the other constituents of the bark, an aqueous solution of the alcoholic extract was divided into two portions, and one of these extracted by chloroform, by which means the emodin was removed. The two solutions were then administered in equal doses, and as far as possible, under similar conditions, but no difference in their action could be detected. The emodin present in cascara, therefore, would appear to exert no purgative action. In order to determine whether the active principle could even approximately be located, the following preparations were physiologically examined. As by the previously described method of procedure, it was probable that only partial separation had been effected, it was to be expected that no sharp distinction in their action would be observed, but that the presence of the active principle would be revealed by the greater activity of one of the preparations. The preparations examined and the results obtained were as follows:

Regenerated lead acetate precipitate—very slightly active.

Regenerated lead subacetate precipitate.

(1) Portion extracted by ethyl acetate—very active.

(2) Residue extracted by alcohol—slightly active.

Filtrate from lead subacetate precipitate—inactive.

The above were given in 7 Cc. (2 drachm) doses of a 10 per cent. aqueous solution.

These results indicate, somewhat conclusively, that the active principle as principles of cascara are contained in that portion of the alcoholic extract which is soluble in water and precipitated by lead subacetate.

Furthermore, it is contained in that portion of the regenerated lead subacetate precipitate which is soluble in ethyl acetate.

The hydrolytic enzyme from the bark was given in 1 gramme doses to a dog and to a man. It was inactive—except for a very slight aperient effect in the man—and there was no indication whatever of griping or nausea at any stage.

Mr. Gane also, at request of the Chair, presented in abstract a paper contributed by Mr. Burt. E. Nelson, of New York, on the same general subject. The following is the text of the paper :

NOTES ON THE PHARMACOLOGY OF CASCARA SAGRADA AND BITTERLESS PREPARATIONS OF CASCARA.

BURT E. NELSON.

Laboratory of the Binghamton State Hospital.

In again presenting this time-honored subject for consideration, I will offer as my excuse the varying degrees of regard in which members of the medical profession hold bitterless preparations of cascara, and an admitted inability on my part to produce one which to my mind ever fully equalled the officinal fluid extract in therapeutic value.

The bitterless fluid extracts as found on the market do undoubtedly vary greatly in their activity, and it was largely for the purpose of comparing the products of some of the different methods of manufacture that the following studies were undertaken.

All were made on the same lot of drug which was purchased in the powdered condition, and was proved to be of good therapeutic value. The most important American contribution to the chemistry of Cascara sagrada is the work of Drs. Dohme and Englehardt, published in the 46th volume of the Proceedings of the American Pharmaceutical Association.

In this they show that the active principle of cascara is a glucoside, precipitated by basic lead acetate, soluble in alcohol, acetone, alkalies and hot water, melting at 237° C., laxative and non-bitter, and related to the anthraquinones.

Certain anthraquinone derivatives had previously been shown by Tschirch to be the active principles of all that class of laxative drugs, *e. g.*, buckthorn, rhubarb, senna, aloes, etc., to which cascara belongs, and the glucoside isolated by Dohme and Englehardt yielded by hydrolysis with acids emodin (trioxymethyl-anthraquinone) and a reducing sugar.

The results of their work have, to the best of my knowledge, been universally accepted, and in the studies detailed below, little or no attempt has been made to isolate and study in a pure condition any of the proximate constituents of the drug, but rather to separate a convenient quantity of it into a number of fractions, and then to compare the therapeutic effect of these upon a number of individuals in order to learn whether the activity of the drug was actually limited to any one fraction solely or whether it might not be shared by a number, and likewise with regard to the bitter principle.

The general plan followed was a modification of a scheme of analysis presented by the writer to the N. Y. State Pharm. Association at the 1902 meeting.

In all the extractions, evaporations, etc., a low degree of heat was maintained by the use of a partial vacuum when necessary, and the action of acids and alkalies was limited as much as possible. The particular lot of drug contained 6.1 per cent. of moisture and 6.57 per cent. of ash.

(1) One kilogramme of the drug was extracted successively in a percolator with warm absolute (98.9 per cent.) alcohol; 75 per cent. alcohol, and officinal dilute alcohol, allowing one to displace the other, and using a litre of absolute, two litres of 75 per cent., and enough dilute alcohol to completely exhaust the drug. The alcohol was then distilled off and recovered under diminished pressure, the resulting extract (30.3 per cent. calculated as dry), taken up in 5 litres of hot 20 per cent. alcohol, 500 grammes of coarsely-powdered pumice added, the whole well shaken, filtered, and the residue on the filter well washed with hot water and dried.

(2) The filtrate and washings from (1) were next treated with a slight excess of 25 per cent. solution of lead acetate, allowed to stand six hours, filtered, slightly washed, and the precipitate again shaken with a fresh lot of water containing a little lead acetate, after which it was again collected on the filters and well washed.

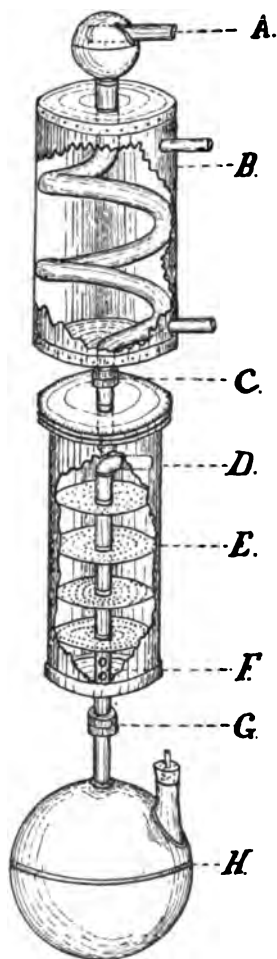
(3) The filtrate and washings from (2) were next treated with a slight excess of basic lead acetate and enough litharge added to convert any remaining normal lead acetate into a basic salt. After occasional stirring during twelve hours, this precipitate was also collected on filters and washed.

(4) A portion of the filtrate from the lead precipitates was freed from lead by means of hydrogen sulphide, the excess of the latter removed by means of an air current, and the filtrate treated with a solution of potassium bismuth iodide (Thresh's reagent). The slight precipitate from this was decomposed with weak caustic soda solution, and transferred to a separator for future extraction. The filtrate was also treated with caustic soda to decompose the excess of reagent, neutralized with acetic acid, and added to the main filtrate.

(5) The excess of lead in the filtrate was removed by treatment with

hydrogen sulphide, and the filtrate evaporated at a low heat with the addition of about one quart of coarse sand, and the resulting extract stirred up with the sand until dry.

(6) The lead acetate precipitate was transferred to a mortar and dissolved in a ten per cent. solution of sodium carbonate, carefully added in small portions, the solution filtered from the resulting lead carbonate, the latter washed, the filtrate and washings neutralized with acetic acid, and evaporated with sand as in (5).



(7) The basic lead acetate precipitate was dissolved in the mortar in sufficient acetic acid, 25 per cent. alcohol added, the lead precipitated by hydrogen sulphide, the liquid filtered, the precipitate washed first with 25 per cent. alcohol, and then with water, neutralized, and the resulting liquids evaporated with sand as in (5).

We have now separated our total drug extract into a portion insoluble in 20 per cent. alcohol and hot water (the so-called resinoids), one precipitated by normal lead acetate (tannins, plant acids, glucosides, colors, etc.), one precipitated by basic lead acetate and litharge (glucosides, extractives, colors, etc.), one precipitate by potassio-bismuth iodide (alkaloids, if any?) and the residue from the final evaporation.

The dried residues distributed over the sand particles were rubbed in a mortar until of uniform fineness and packed in the special extraction apparatus shown in the sketch for treatment with various solvents.

This apparatus has proved very efficient, as when necessary, it allows of continued application of the solvent under diminished pressure, and consequently at a lower boiling temperature, and by careful management nearly all of the solvent may be regained and recovered by distillation for future use. To guard against loss it must be supplied with a capacious condenser, when the application of even very slight suction at the top will effectually prevent leaks from any untight joints, should such exist.

(8) The resinoid residue insoluble in 20 per cent. alcohol and hot water was extracted in succession with petroleum ether (B. P. 40–60 Cent.), stronger ether, coal-tar benzene, chloroform, and absolute alcohol, the various solvents distilled off under diminished pressure, and the residues in the flasks numbered successively from 1 to 5.

(9) The dried residue on the sand from the lead acetate precipitate was similarly extracted with chloroform, ether, acetic ether, 75 per cent. alcohol, and (by direct percolation) water, and the residues remaining after distilling off the solvents numbered from 6 to 10.

(10) The residue from the basic lead acetate precipitate was extracted with coal-tar benzene, chloroform, ether 75 per cent., alcohol 25 per cent., 75 per cent. alcohol, and (by direct percolation) hot water, and the residues remaining after distilling off the solvent, numbered from 11 to 15.

(11) The solution from the very slight residue precipitated by potassio-bismuth iodide was shaken out in the separator with coal-tar benzene from acid solution, and after making slightly alkaline with ammonia, with petroleum benzene, chloroform and chloroform 75 per cent., alcohol 25 per cent., and the successive separates evaporated and numbered from 16 to 20. (In a subsequent examination no alkaloids were found in this precipitate.)

(12) The residue from the final filtrate was extracted with chloroform, ether 75 per cent., alcohol 25 per cent., 75 per cent. alcohol, and water, and the residues numbered from 21 to 24.

(13) 1000 grammes of the original drug powder were distilled with steam, the distillate shaken out with light petroleum ether (B. P. 30–40 Cent.), and the latter evaporated in a desiccator in a current of dried air. There remained 2 grammes of a greenish-yellow oil having characteristic odor of the drug, No. 25.

Each of the residues from the foregoing partial analysis was taken up in

litre of alcohol or 50 per cent. alcohol, as seemed best suited, thus making in reality a fluid extract of each of the twenty-five fractions. Where solution was imperfect as was frequently the case, the mixture was stirred up well each time it was used.

Each of these preparations was next administered regularly to a number (8) of nurses who habitually used the drug, in 5 Cc. doses each night, and the effects produced compared as closely as was possible with the effects produced by a similar dose of the U. S. P. fluid extract prepared from the same lot of drug. Where a fraction was found to be inactive in this dose, it was finally tried in larger amounts (25-30 Cc.) to insure certainty. In this way it was determined that fraction No. 6 was very bitter, and Nos. 4, 5 and 7 slightly so, probably from imperfect separation.

Similarly it was found that fraction No. 14 was very active, while Nos. 12, 13, and 8 and 9 were slightly so, the two latter in the somewhat larger doses, however, an effect which might have been enhanced by removing the tannins. Neither of the other fractions could be classed as either active or bitter, although a number had a disagreeable taste. The results obtained with the different persons on whom the preparations were tried were in nearly every case entirely in harmony, and in the two or three exceptions reasonable excuses seemed to have been found for the discrepancies. Attempts to crystallize and study the glucosides from the active fractions were but partially successful, and may be attempted at another time.

These results practically agree with those attained by Drs. Dohme and Engelhardt, arrived at by some different methods, aside from the slight laxative properties of some of the lead acetate precipitate fractions.

Attempts were next made to compare pharmaceutical preparations from which the bitter principle had been wholly or partly removed, with the standard U. S. P. preparation.

A. 1000 grammes of drug and 350 grammes of calcined magnesia were moistened and extracted with 25 per cent. alcohol, and concentrated to 1000 Cc.

B. 1000 grammes of drug and 350 grammes of magnesia were extracted with hot water, and concentrated to 1000 Cc.

C. 1000 grammes of drug and 350 grammes of lime were moistened in the usual way, extracted with 25 per cent. alcohol, and concentrated to 1000 Cc.

D. 1000 grammes of drug and 350 grammes of lime were similarly extracted from hot water.

E. 1000 grammes of drug were moistened with 2 per cent. caustic soda solution, allowed to swell during 24 hours, packed lightly in a percolator and extracted, first, with 2000 Cc. of warm 1 per cent. caustic soda solution and finally with hot water, and concentrated to 1000 Cc., after which the caustic soda was converted into bicarbonate by means of carbonic acid gas.

F. 1000 grammes of drug were extracted by dilute alcohol as in the official process, treated with 50 grammes of caustic soda, and evaporated on a hot-water bath to about 500 Cc.

Enough dilute alcohol was then added to bring the measure up to one litre, and the caustic soda converted into bicarbonate by means of carbonic acid gas.

These preparations were tried on the same eight individuals as were the previous fractions, and were checked at intervals by occasional doses of the original officinal fluid extract.

Samples A and B were each practically bitterless, but neither was quite as active as the standard sample, B being the least active.

Samples C and D were each practically bitterless but were also but slightly active, especially after being kept for some time.

Sample E was quite bitter, and had apparently lost part of its activity.

Sample F was also quite bitter, but fairly active.

As it is as yet practically impossible to obtain measurable results by means of any pharmacological instruments, of the quantitative action of these laxative drugs, I have had to content myself with the methods here employed. The results, however, have agreed among themselves sufficiently well to satisfy myself and the associates who took part in the tests that bitterless preparations of cascara prepared by either of the above methods do not represent fully the laxative qualities of the original drug. The loss of activity, however, may be so slight in the better preparations as to fully warrant their use on account of their much pleasanter taste.

That the processes followed may be more readily seen, the following tabular synopsis is appended :

SYNOPSIS.

100 per cent. preparations of fractions of the drugs, *i. e.*, each fraction made up to a volume equal to the bulk of a fluid extract of the original drug powder.

1000 grammes of drug extracted in succession with absolute alcohol, 75 per cent. alcohol, and officinal dilute alcohol, the alcohol distilled off under diminished pressure, the resulting extract taken up with hot 20 per cent. alcohol, and the residue washed with hot water.

A. Residue insoluble in 20 per cent. alcohol and hot water.

(Resinoids—fats, waxes, resins, etc.)

Extracted with	Bitterness.	Activity.
1. Petroleum ether.....	absent	absent
2. Stronger ether	absent	absent
3. Benzene	absent	absent
4. Chloroform	slight	absent
5. Absolute alcohol	slight	absent

B. Lead Acetate Precipitate.

(Tannina, colors, other glucosides, plant acids, etc.)

Extracted with	Bitterness.	Activity.
6. Chloroform.....	strong	absent
7. Stronger ether.....	slight	absent
8. Acetic ether.....	absent	slight
9. 75 per cent. alcohol.....	absent	slight
10. Alkaline water.....	absent	absent

C. Basic Lead Acetate Precipitate.

(Glucosides, extractives, colors, etc.)

Extracted with	Bitterness.	Activity.
11. Benzene.....	absent	absent
12. Chloroform.....	absent	slight
13. Ether 75 per cent., alcohol 25 per cent.	absent	slight
14. 75 per cent. alcohol.....	absent	strong
15. Water.....	absent	absent

D. Potassio Bismuthic Iodide Precipitate.

(Very slight, afterward found to contain no alkaloids.)

Extracted with	Bitterness.	Activity.
16. Benzene (acid solution).....	absent	absent
17. Petroleum benzine (alkaline solution)....	absent	absent
18. Benzene (alkaline solution).....	absent	absent
19. Chloroform (alkaline solution).....	absent	absent
20. Chloroform 75 per cent., alcohol 25 per cent.	absent	absent

E. Final Residue from Final Filtrate.

(Extractives, glucosides, sugars, few colors, etc.)

Extracted with	Bitterness.	Activity.
21. Chloroform.....	absent	absent
22. Ether 75 per cent., alcohol 25 per cent....	absent	absent
23. 75 per cent. alcohol.....	absent	absent
24. Water.....	absent	absent

F. Volatile with Steam from Original Drug.

(Volatile oils.)

Extracted with	Bitterness.	Activity.
25. Light petroleum ether.....	absent	absent

100 per cent. preparations from entire drug, *i. e.*, fluid extracts.

Drug.	Addition.	Menstruum.	Bitterness.	Activity.
o. 1000 g.	—	50 per cent. alcohol	strong	strong
A. 1000 g.	350 g. MgO	25 per cent. alcohol	absent	lessened
B. 1000 g.	350 g. MgO	hot water	absent	lessened
C. 1000 g.	350 g. CaO	25 per cent. alcohol	absent	diminished
D. 1000 g.	350 g. CaO	hot water	absent	diminished
E. 1000 g.	—	2 per cent. NaOH	present	diminished
F. 1000 g.	5 per cent. NaOH	50 per cent. alcohol	present	lessened

DESCRIPTION OF DRAWING.

- A. Trap opening at top of condenser for connection with air pump.
- B. Condenser, which to economize space is here drawn to a scale smaller than its actual relative size.
- C. Coupling.
- D. Removable ell at top of central pipe.
- E. Series of perforated loose diaphragms, the lowest one of which rests on shoulders and when covered by filter paper, supports the lightly packed powder to be extracted, the others being simply introduced at intervals during the packing to evenly distribute the menstruum.
- F. The two openings in central pipe, below the powder, through which the percolate runs back into the still body.
- G. Coupling.
- H. Still, which rests in water bath while in use.

The apparatus is constructed of copper and brass throughout.

The vapors from the boiling menstruum in the still ascend through the central pipe and are directed against the side of the extractor above, being prevented from issuing at the lower openings by the resistance of the moist powder. After being condensed above, the liquid flows back upon the ell and is evenly distributed by the perforated disks during its descent through the powder. Finally, the percolate returns to the still through the openings in the lower portion of the central pipe.

The same principle is applicable to many larger operations.

Mr. Dohme said he desired to congratulate the Association upon receiving such a valuable and interesting communication from Dr. Jowett. He had not had time to examine it carefully as yet, and it was too long to enable him to criticise it without careful examination, but from Mr. Gane's abstract and his own casual observation, it seemed to be largely a case of tearing down what had been built up, and placing something else in its place. It would naturally stimulate criticism and lead to further work on this interesting drug. He could not agree with the conclusion that cascara contained emodin. He thought, however, that the explanation of the difference of opinion was very simple, viz.: that Dr. Jowett had worked, apparently, on bark from two to four years old, whereas the bark he himself examined was fresh—only about three months from the tree. It is generally known that cascara bark, by aging, is changed as to its glucoside.

Mr. Gane replied that Dr. Jowett had used both the fresh bark and the mature, and had found no difference. He read from the report to sustain this proposition.

Mr. Dohme thought, nevertheless, this was a possible explanation of the radical difference as to per cents of emodin in the bark, and said the bark he examined gave no emodin, either by extraction with benzin or ether.

Mr. Hallberg, referring to the author's remarks on alcoholic extract near the close of this paper, said if he meant an extract prepared with a strong alcohol menstruum, he was not surprised at the results obtained. It is necessary to have a certain amount of water. The infusion is much stronger relatively where from 50 to 60 per cent. alcohol is used.

Mr. Gordin thought that, on account of Dr. Jowett's very high standing members should be very careful of criticism of his work, when he was not present to defend himself, though, of course, if anybody could find fault with his work he had a right to prove to Dr. Jowett that he was mistaken. He thought any criticism should appear in the chemical literature.

Mr. Hallberg thought that any paper read before this Association was open to discussion; otherwise it should be read by title only.

Mr. Gane said he had a personal letter from Dr. Jowett, in which he said he expected criticism, and would be delighted to see it in print. He mentioned several points in the paper that he thought might be the subject of criticism.

Mr. Hallberg called attention to the fact that a full line of these articles, a dozen or more, were on exhibition at the World's Fair, in the research booth of Burroughs, Wellcome & Co.

Mr. Kremers said this paper of Dr. Jowett's was in reality a contribution to American and English pharmacy, and involved a great amount of research and labor. Mr. Kremers also spoke of the exhibit at the World's Fair, and said that the cabinet representing the Wellcome Research Laboratory was the result of the work of Dr. Power (and his co-laborers), who was an American and a member of this Association. It has been remarked, he said, that it was a pity that America should lose so good a man as Dr. Power, but his reply to that was that America justly could feel proud to have sent such a man to England to revolutionize the pharmaceutical manufacture of that country. (Applause.)

On motion of Mr. Caspari, the papers of Dr. Jowett and Mr. Nelson were received and referred for publication.

General Secretary Caspari asked for instructions as to what he should do with the package in his hands made up of the boxes which had contained the samples under investigation in the Beringer matter, up for discussion this afternoon. He said he would like to offer a motion that they be returned to E. L. Patch, Chairman of the Committee on Drug Market, with instructions to preserve them intact until further called for. The proposition was discussed by Messrs. Hallberg, Wilbert, Mayo, Schlotterbeck, Kirchgessner and Hays, with almost as many varying views as to the proper disposition to be made of these containers, but finally a motion made by Mr. Mayo prevailed, to the effect that the General Secretary be instructed to seal them up, in the presence of witnesses, and retain them in his charge. Mr. Caspari stated that the original samples had been divided by Prof. Prescott, chairman of the special committee of investigation, into four different parts, of which each of the three members of the committee received one, Mr. Prescott retaining intact the fourth part, and he thought he should be instructed to return this one-fourth portion to the General Secretary, to be preserved with these empty cases. After some brief remarks by Messrs. Mayo and Wilbert this motion prevailed.

The Chair stated that, without objection, he would now call on Mr. A. R. L. Dohme to read four papers in succession that he had prepared for this Section, one of which was closely related to the paper last read and discussed.

Mr. Dohme then presented, first, his paper on Copaiba in abstract, the following being its full text :

COPAIBA.

BY A. R. L. DOHME AND H. ENGELHARDT.

It is a difficult matter to endeavor to establish a standard or to settle upon some basis upon which to work out the condition of the market in case of a substance like copaiba. There is no definite knowledge as to just what plant it is obtained from, and its native land is about as variable as its physical condition when reaching this country. Being such a Bohemian in its habits, it is hardly fair to expect much of balsam copaiba in the way of uniformity or purity. It does, however, fully live up to its reputation, and we are inclined to agree with Gehe & Co. and Caezar & Loretz, two of the leading German wholesale drug houses and importers, that nearly all the copaiba offered for sale, or, for that matter, imported, is adulterated, usually with rosin. Whether this is done by the gatherers, or the shippers, or by the importers, it is difficult to say. It is natural to expect that a product that varies so in its habitat and its physical and chemical properties is a fruitful field for sophistication. Did it ever occur to any of you how very few pharmacists ever test the goods they buy, and to what an enormous extent they are dependent upon the honesty and integrity of the jobber, not merely for the purity of their goods, but as well their identity? The Pharmacopœia gives the descriptions and the tests to identify the goods and their impurities, but the pharmacist says: "Surely my jobber would not send me an impure article; I'll take it for granted that it is pure." Let me tell you right here that there are jobbers who are shrewd enough to know this condition of mind of the retailer, and, taking their chances of being caught, send out adulterated goods. Even among the jobbers who are lauded as model jobbers and do a large business, may be found some who play their very reputation for all it is worth in the adulterating line. As we do considerable testing, we know that adulteration is carried on, and in copaiba in particular we found evidences of it. Numerous methods to detect the adulterations of copaiba, consisting chiefly of rosin, gurjun balsam, paraffin, turpentine and fixed oils, have been suggested and tried, but most of them have proved unreliable. Balsam copaiba is a solution of acid and neutral resins in a volatile oil. From the resin, several acids have been isolated, viz.: (1) Copaibic acid ($C_{20}H_{30}O_4$) by Schweitzer, a crystalline body with the melting-point $131^{\circ}C$. (2) Oxy-copaibic acid ($C_{20}H_{28}O_5$) by Fehling; melting-point $120^{\circ}C$. (3) Metacopaibic acid ($C_{22}H_{34}O_4$) by Strauss from Maracaibo balsam, melting-point

205°–206° C. H. Mach found later on that this body was a cholesterin-like compound of the formula $C_{16}H_{23}OH$. Several more acids were isolated by Tschirch in 1899, differing from that just mentioned in properties and composition. The volatile oil is a colorless or light-yellow, strongly lævogyrate liquid with a peculiar odor and an aromatic taste, sp. gr. 0.90–0.91. Wallach found that it consists chiefly of caryophyllene, a sesquiterpene with the formula $C_{15}H_{21}$. Up to the present time it has not been definitely decided whether the oil or the resin has the greater therapeutic value, although the preponderance of opinion seems to lean toward the resin being the more active. The specific gravity depends upon the amount of resin dissolved in the volatile oil. The Brazilian or Para balsams have a low specific gravity, and the percentage of resin seldom exceeds fifty per cent. The balsams from northern South America and the West Indies have a higher specific gravity, and, consequently, a higher percentage of resin. The balsam of the East Indies (gurjun balsam or balsam dipterocarpi), and from West Africa (Illurin balsam), have a high specific gravity, but a proportionately low percentage of resin. The following samples of balsam were examined, and of these the first six were Brazilian balsams, or were labeled as such. They were all bought in the open market from the various leading sources of copaiba balsam in this country.

	Sp. gr.
I. <i>Para</i> , light brownish color, oily, not fluorescent.....	0.950
II. <i>Para</i> , light-brownish color, semi-viscid, not fluorescent.....	0.975
III. <i>Para</i> , light-brownish color, oily to semi-viscid, not fluorescent..	0.962
IV. <i>Para</i> , light-yellowish color, oily, not fluorescent.....	0.935
V. <i>Para</i> , light-brown color, semi-viscid, slightly fluorescent.....	0.966
VI. <i>Para</i> , yellowish color, oily, not fluorescent.....	0.923

Dieterich,* in numerous estimations found that Para balsam possessed the specific gravity 0.95–0.97, which would agree well with I, II, III and V, and Gehe & Co.† found that large quantities of light Para balsam with a specific gravity 0.930 and lower are imported and used for manufacturing the balsams of a higher specific gravity by mixing them with rosin. These light Para balsams are represented by IV and VI. Umney‡ gives the specific gravity for two Brazilian balsams—0.938 for Bahia and 0.920 for Para.

	Sp. gr.
VII. <i>Maracaibo</i> , semi-viscid, yellowish-brown, slightly fluorescent..	0.983
Umney found 0.963, Dieterich 0.981–0.990 for Maracaibo balsam.	
VIII. <i>Angostura</i> , almost viscid, light-brown, slightly fluorescent	0.991
Praël found sp. gr. 0.981–1.004.	
IX. <i>Maranhão</i> , light-brownish, oily to semi-viscid, not fluorescent.	0.976

* Helfenberg Ann., 1897.

† Geschäftsberichte und Pharm. Centralh., 1899.

‡ Pharm. Journ., 1901, page 324.

Umney found sp. gr. 0.990

X. *Central American*, light-brown, oily, not fluorescent..... 0.976

XI. *African*, brown, viscid, fluorescent..... 0.966

XII. *African*, same as XI.

Gehe & Co. found sp. gr. 0.990 for African balsam.

A sample of gurjun balsam obtained was a light, brown-colored, oily liquid, strongly fluorescent, and had a specific gravity of 0.960. Dieterich found its gravity to be 0.958–0.964.

The specific gravity of balsam copaiba, as given in the different pharmacopœias, differs very much. The Br. Pharm. gives the sp. gr. 0.916–0.993, allowing, therefore, a balsam with less than 20 per cent. of resin, or, in other words, ascribing very little therapeutic value to the resin. The U. S. P. gives a low specific gravity also, 0.940–0.990, while the German and Swiss Ph. prefer the heavy, thick balsams, with 50 per cent. and more of resin, giving sp. gr. 0.960–0.990, or not less than 0.960.

EXAMINATION FOR ADULTERATIONS.

Gurjun Balsam.—This balsam possesses little therapeutic value, consequently is cheaper in price, and is frequently used as an adulterant of balsam copaiba. In fact it shares with rosin the place of chief adulterant. Copaiba is generally described as not fluorescing, inasmuch as it is assumed that the fluorescence would indicate an adulteration with gurjun balsam. This view, however, has been contradicted recently, for some strictly genuine balsams that were obtained from the trees by trustworthy hands have shown decided fluorescence. The methods for detecting gurjun balsam were applied as follows:

(1) Add 2 to 4 drops of the balsam to 1 or 2 Cc. of a solution of 1 Gm. pure sulphuric acid in 25 Gm. of pure acetic acid. No red or violet color should be produced. Pure copaiba gives only a yellow or pale brownish color.

A pink color was produced by balsams XI and XII only, a faint pink color by balsam II* + 10 per cent. gurjun, and a distinct pink color by balsam II + 20 per cent. gurjun. This reaction shows an adulteration of 15 per cent. or more of gurjun.

(2) Shake the balsam with 3 to 4 volumes of water, filter through a wetted filter and mix the filtrate with an equal volume of HCl (1.12). No red color should be produced within 15 minutes. Balsams IV, VII and VIII gave a faint pink color; balsams VI and II + 10 per cent. gurjun a decided pink color. This reaction shows the presence of less than 10 per cent. gurjun balsam.

(3) Add 4 drops of pure nitric acid (1.42) to 1 Cc. of glacial acetic acid in a test-tube, mix well, and then pour carefully on top of the liquid 4 drops of balsam. In presence of gurjun balsam a reddish zone will be observed within a few minutes between the balsam and the acid. On

* Balsam II was found to be the purest.

shaking, the whole liquid assumes a reddish or purplish color. By this test all the balsams showed a more or less pink color; the deepest color appeared with VI, VIII, XI and XII and the balsam mixed with gurjun. This is the most delicate reaction, and shows a very small percentage of gurjun.

(4) To a mixture of 4 Cc. of acetic ether and 2 drops of sulphuric acid add 6 to 8 drops of the balsam. No red color should be noticed within 15 minutes. If no distinct coloration is noticed, add a drop of water and shake. No red-colored precipitate should be formed. All the balsams tested gave negative results by this test, and it is hence probably of no value.

(5) Boil a mixture of 1 volume of balsam, 3 volumes of alcohol, and 1 Gm. of stannous chloride until solution is effected. The presence of 10 or more per cent. of gurjun balsam will give an intensely red color, which within 30 minutes changes to violet-blue. A distinct reaction was observed with balsam VIII and balsam II + 10 per cent. gurjun. The test, therefore, shows 10 per cent or more of gurjun.

(6) 1 part of balsam copaiba is dissolved in 19 parts of carbon disulphide and treated with a *freshly-prepared* cooled mixture of equal volumes of sulphuric acid and nitric acid. No red or violet color should appear. Slight red color appeared with I, V, VII and IX, deep red color with VI, VIII, XI, XII, and the pure balsam mixed with 10 per cent. gurjun. The test, therefore, shows the presence of less than 10 per cent. of gurjun balsam.

(7) 1 part of balsam copaiba is shaken with 5 parts of water (50° C.). After warming on a water-bath, two *clear* layers should be formed. The presence of any gurjun balsam causes an emulsion. As all the balsams stood this test, even VI, VII, VIII, XI and XII, which gave strong reactions by tests 3 and 6 (No. II + 10 per cent. gurjun, however, gave an emulsion), it can be concluded that all the balsams contain less than 10 per cent. of gurjun.

According to these tests, VI and VIII are very likely adulterated to some extent with gurjun balsam. Whether or not it is the case with XI and XII can not be said. The volatile oil in African balsam is different from the oil in the other copaibas, and may give the reactions for gurjun balsam without being adulterated with it.

DETECTION OF PARAFFIN.

If one volume of the balsam be mixed with three volumes of alcohol, the mixture heated to boiling, and then allowed to stand and cool for one hour, no oil drops should separate. Only Nos. IV and VI, the two balsams with the low specific gravity, showed oil separated, and VI considerably more than IV.

DETECTION OF FIXED OILS.

(1) 20 drops of the balsam are boiled for a few minutes with 1 Cc. of 20 per cent. alcoholic caustic soda solution, and, after cooling, twice the volume of ether is added. No jelly should be produced. All the balsams stood the test.

(2) The test of the U. S. P., that, when the volatile oil is driven off by heating the balsam in a flat-bottomed capsule, the residue, when cold, should be amorphous, transparent and friable, is not good for all balsams, for even IV and VI, which apparently are adulterated with paraffin, gave a rather hard residue. Kebler also found that a balsam, from which 92 per cent. of oil was driven off, left a resin which was far from being brittle. All the balsams in question gave a hard, more or less brittle residue.

DETECTION OF TURPENTINE.

When copaiba is heated it should not evolve an odor of turpentine. All the balsams answered this test.

DETECTION OF ROSIN.

The most common adulterant is rosin, and unfortunately, there is not one perfectly reliable test to detect it. The U. S. P. does not give a test for rosin. Test No. 7, as applied for detection of gurjun, may be used for detection of rosin also. When treated in that way, in presence of rosin, turpentine, etc., the aqueous layer will be more or less turbid. With exception of VIII, IX, XI and XII, which gave very cloudy solutions, all the balsams answered this test, the solutions being only opalescent or slightly turbid.

The German Pharmacopœia proposed the following test, which, however, is not perfectly reliable either, and allows balsam with a considerable amount of rosin to escape.

Shake 1 part of the balsam with 10 parts of ammonia. A more or less turbid mixture results, which must not within one day gelatinize or separate a jelly. No. IX and No. II + 10 per cent. rosin showed a slight gelatinization; XI and XII gelatinized at once.

In 1896,* Bosetti proposed a test, based on the fact that a genuine balsam can be mixed with 30 per cent. of rosin without gelatinizing, when shaken with ten times the amount ammonia water, but that gelatinization takes place when the balsam is mixed with 35 per cent. or more of rosin. A balsam, therefore, which gelatinizes when mixed with 30 per cent. rosin and shaken with ten times the amount of ammonia water, contained originally 5 per cent. rosin. This test was applied to the samples in question, and not one escaped it. In all cases except IV, XI and XII, a slight gelatinization took place—these three forming a solid jelly. A balsam,

* Pharm. Centralhalle, 1896.

which only slightly gelatinizes when mixed with 30 per cent. of rosin and treated as above, should be passed as acceptable, owing to the fact that a genuine balsam cannot easily be obtained on the market ; but such as form a solid jelly should be rejected as inferior. Whether or not rosin is in African balsam cannot be said, because the volatile oil as mentioned above behaves differently from the oil of the other copaibas.

SOLUBILITIES.

Kebler and other investigators found that the solubility or the insolubility of the balsams in the different liquids is a rather uncertain factor. In absolute alcohol, III, VII, X, XI and XII were completely soluble ; I, II, V, VI and VIII were not perfectly soluble ; after some time floccules separated from these solutions. IV only gave a strong turbidity, and yielded, after standing, a heavy flocculent precipitate. Increased adulteration with gurjun or rosin had no material effect on the solubility in absolute alcohol.

In ether and chloroform all the balsams, including all those mixed with gurjun and rosin, were completely soluble.

In petroleum ether, I, III and IX were completely soluble, almost so, II, IV, VI, VII, VIII and X ; XI and XII showed a strong turbidity, and, after some time, a heavy flocculent precipitate settled.

The balsam, mixed with gurjun and rosin, showed, when dissolved in petroleum ether, strong turbidity, and a heavy flocculent precipitate separated, increasing with the increased amount of gurjun or rosin present.

Gehe & Co. claim that the heavy balsams are not at all soluble in petroleum ether, but give a turbid solution and a heavy precipitate after standing. If this be true, an imperfect solubility of the balsam in petroleum ether does not show an adulteration with gurjun or rosin.

In carbon disulphide all the balsams, including those mixed with rosin, were nearly completely soluble ; those mixed with gurjun showed a more or less strong turbidity, and, after standing, a correspondingly large precipitate was formed in proportion to the amount of gurjun added.

DETERMINATION OF ACID, ESTER AND SAPONIFICATION NUMBERS.

The German Pharmacopœia, for determining the purity of the balsam, has adopted an acid, ester and saponification number. The acid number, or the number of Mg. of caustic potash necessary to neutralize 1 gr. of the balsam, is determined in the following way : 1 gr. of the balsam is dissolved in 50 Cc. of alcohol (free of acid), and after addition of 1 Cc. phenolphthalein solution (1 : 100), titrated with $\frac{N}{2}$ alcoholic caustic potash. The number of Cc. of caustic potash used multiplied by 28 gives the acid number.

To find the ester number, *i. e.*, the number of Mg. of caustic potash which is taken up by 1 gr. of the balsam when heated for $\frac{1}{2}$ hour with an excess of caustic potash, 20 Cc. of $\frac{N}{2}$ alcoholic caustic potash are added to

the above neutral liquid, and the mixture heated for $\frac{1}{2}$ hour on a water-bath in a flask provided with a reflux condenser. After cooling, excess of caustic potash is titrated with $\frac{N}{2}$ HCl solution. Number of Cc. alcoholic caustic potash consumed multiplied by 28 gives the ester number. Acid number + ester number combined gives saponification number.

It may be mentioned here that some balsams when heated with an excess of caustic potash for a longer time (1 hour) give a somewhat higher ester number, and therefore higher saponification number. Results are given with those obtained by heating for $\frac{1}{2}$ hour.

Dieterich * proposes cold saponification, and proceeds as follows: 1 gr. of the balsam is mixed with 20 Cc. of $\frac{N}{2}$ alcoholic caustic potash and 50 Cc. of petroleum ether (b. p. 60° – 70°), and the mixture allowed to stand in a well-stoppered bottle for 24 hours. After diluting with strong alcohol, excess of caustic potash is titrated with $\frac{N}{2}$ HCl solution, using phenolphthlein as indicator. Number of Cc. of $\frac{N}{2}$ caustic potash used multiplied by 28 gives the saponification number. By deducting from this the acid number, which has to be determined separately, the ester number is obtained.

The following results were obtained with the different balsams:

	Heated for $\frac{1}{2}$ hour.			Heated for 1 hour.			Cold saponification.		
	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.
I.	52	9.3	61.3	52.2	13.5	65.8	52.3	11.4	63.7
	52.3	9.3	61.6						
II.	65.7	6.3	72.0	66	14.8	80.8	66	10.1	76.1
	65.5	6.6	72.1						
III.	67	7	74	68.3	15.3	83.6	68	8.1	76.1
	68	7	75						
IV.	24.5	9.5	34	25	15.1	40.1	25	8.1	33.1
V.	64	10.4	74.4	62.6	9.5	72.1	59.8	6.5	66.3
VI.	20.2	11.8	32	20.5	12.1	32.6	20.5	7.6	28.1
	20.6	12.4	33						

These six balsams were bought as Para balsams. Dieterich found for Para balsams an average sp. gr. 0.950–0.970. Acid number 30–60, ester number 2–8, and saponification number 30–65. These figures agree well with I, while the results are rather low in IV and VI and rather high in II, III and V. IV and VI belong to those above-mentioned light Para balsams, and show in comparison with their specific gravity a very low acid number, due to the fact that they are adulterated with paraffin, etc.

Umney † found for Para and Bahia balsams with a low specific gravity the following figures:

	Sp. gr.	Acid	Ester.	Sapon.
Para.	0.920	33.1	26.9	60
Bahia	0.938	33.7	15.3	49

* Loc. cit.

† Loc. cit.

The figures obtained in II, III and V compare well with those obtained by Dieterich with some Para and Bahia balsams.

Para	61.62	9.06	70.68
Bahia	64.25	2.6	66.85
Bahia	81.27	6.05	87.32

The results obtained with the other balsams were as follows :

	Heated for $\frac{1}{2}$ hour.			Heated for 1 hour.			Cold saponification.		
	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.
Maracaibo....	77	7.6	84.6	77.12	11.8	89	79.2	3.3	82.5
	76	8.2	84.4						
Angustura	91	10.2	101.2	87.1	15.8	102.9	87.1	10.1	97.2
	87	10	97						
Maranhm....	78.8	6.3	85.1	78.5	12.4	90.9	78.5	4.6	83.1
Centr. Am.....	68	8.9	76.9	....	....	....	68	1.1	69.1
	69	8.7	77.8						
African I....	72	7.4	79.4	71	8.9	79.9	71	5.5	76.5
African II....	73	8.5	81.5	....	....	....	73	3.9	76.9
	74	8.2	82.						

Dieterich and other investigators found for some of these balsams the following figures :

	Dieterich.			Umney.			Beckurts.		
	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.	Acid.	Ester.	Sapon.
Maracaibo....	91	7.7	98.7	50.2	12.1	62.3	....	....	....
	77	9.8	86.8						
Angustura....	79	15	95	....	....	....	99.6	0.0	99.6
	83	8.4	91.4						
Maranhm.....	....	....	....	81.5	12.8	94.3			
Centr. Am.....	49	56	105						
(if identical with	62	41	103	56	28	84	88.9	0.0	88.9
Carthagena.)	88	4	92						
African	58.7	9.6	68.3						
	59.3	9.6	68.9						

All these results show that even balsams of the same origin give widely differing figures, and that it is impossible therefore to fix a limit of variation for the different kinds of balsam.

These methods, therefore, have been criticised very much, and are considered by many investigators as perfectly unreliable in judging the quality of a balsam.. Gehe & Co. made numerous experiments which proved that a balsam with a sp. gr. 0.950-0.970, and an acid number of 40-60, as required for Para balsam, and of a sp. gr. 0.980-0.990, and an acid number of 75-85, as required by the Gerin. Pharm., can easily be made of the above-mentioned light Para balsams by addition of 20 per cent. and 40 per cent. of rosin.

	Sp. gr.	Acid.	Ester.	Sapon.
Para balsam, genuine.....	0.931	30	8	38
+ 20 per cent. rosin	0.956	51	7.5	58.5
+ 40 per cent. rosin	0.982	77.7	2.	79.7

The determination of the ester and saponification number is of no importance, as these figures vary very little, and, besides, vary with the method applied to determine them.

If, therefore, the determination of the acid number is to be of any value, the absence of rosin and of gurjun also should be proven previously. Rosin increases the number; gurjun decreases it considerably. A balsam with a high sp. gr., and a low acid number is suspicious and very likely adulterated with gurjun.

Dieterich gives the following figures for gurjun balsam. Acid number 5-10; ester number, 1-10; saponification number, 10-20, which agree very well with an examined sample giving acid number, 9.4; ester number, 0.0; and saponification number, 9.4.

The determination of the ester number is of value only when the balsam is adulterated with olive oil, or other fixed oils. In these cases the balsams have a rather low specific gravity, but the ester number is increased considerably.

To show the increase and decrease of the acid number produced by the addition of rosin and gurjun, the following table may serve:

	Acid number.		Acid number.
Balsam II.....	65.5	Balsam II.....	65.5
+ 10 per cent. rosin.	75	+ 10 per cent. gurjun.	59
+ 20 per cent. rosin.	86	+ 20 per cent. gurjun.	55
+ 30 per bent. rosin.	92.6	+ 30 per cent. gurjun.	48
		+ 50 per cent. gurjun.	36.7

The ester and saponification numbers varied very little and are of no importance. The following method gives somewhat more satisfactory results: A good copaiba balsam should contain about 50 per cent. of resin, determined by heating a weighed quantity of the balsam in a flat capsule on a water bath for 48 hours to a constant weight. This residue should be light in color, transparent, and in most cases brittle. Gurjun contains only about 25 per cent. of resin, and therefore a balsam with a high specific gravity and a small percentage of resin is very likely adulterated with gurjun. Besides, the resin of gurjun balsam has a low acid number, 35-40. Rosin, however, has a very high acid number, 157-175. Adulteration with gurjun balsam will therefore decrease, and adulteration with rosin increase the acid number of the resin considerably. The 12 balsams in question gave the following results when treated as just mentioned.

Per cent. resin.	Acid number of resin.		Per cent. resin.	Acid number of resin.
I. 38.6	127	VII. Maracaibo	51	149
	136			155
II. 51.8	128	VIII. Angostora	60	132
				140
III. 47.7	133	IX. Maranhão	55.9	131
				137
IV. 28.9	86	X. Central Am.....	47.4	143
			47.8	146
V. 46.7	131	XI. African I.....	49.5	143
	134			
VI. 22.8	92.6	XII. African II.....	49.4	145
			50	146

In case of the four Para balsams, I, II, III and V, the acid number is almost the same (128-136) : balsams VIII and IX give similar figures, while VII, X, XI and XII give somewhat higher results. IV and VI do not agree at all, and are strongly adulterated with a neutral resin and, as shown above, with paraffin. The latter must have a high melting-point, as the residue left after removing the volatile oil was rather hard.

Umney found the following percentage of resin and the acid numbers thereof :

	Per cent. oil.	Per cent. resin.	Acid number of resin.	Character of the resin.
Para	62.4	37.6	68.9	Very soft.
Bahia	49.7	50.3	73.1	Soft.
Maranhão	41.8	58.2	136.3	Brittle.
Maracaibo	42.5	47.5	80.3	Firm, but not easily pulverized.
Carthageña....	41.3	48.7	135.7	Brittle.

The figures of Para and Bahia balsam vary widely from those reported above. It is difficult to understand how Umney could obtain from balsams with the sp. gr. 0.920 and 0.937, respectively, 37.6 per cent. and 50.3 per cent. of resin. He reports that the resins were very soft, and therefore the volatile oil very likely was not removed completely. If this can be done, the acid numbers of the resin will be increased, and will come nearer to those reported above for the two light Para balsams.

Maranhão balsam and Carthageña balsam, if the latter is identical with Central American balsam, agree very well with the above balsams, as well in percentage of resin as in the acid number of the same. In Maracaibo balsam the percentage of resin agrees well with the balsam examined ; the acid number, however, falls very low, and would give an acid number of 38.1 only for the original balsam. Whether or not this is due to an adulteration with gurjun balsam or other substances is not given in his publication. Among numerous reported assays of Maracaibo balsam such a low acid number could not be found.

From a study of these figures and results it is evident that it is difficult to say positively that any one kind of copaiba is the best, because each kind varies among its own samples considerably. The German Pharmacopœia has made only the heavy resinous copaibas official, and sets Maracaibo and Angostura copaibas as the best. Our present Pharmacopœia has leaned rather to the lighter copaibas, rich in volatile oil, as the best, viz., Para and Maranham. Until some experiments are made to establish whether the volatile oil or the resin of copaiba is the more efficient therapeutically, it is difficult to establish a criterion of efficiency. The best that we can do in the light of our present knowledge is to not condemn any copaiba that measures up to a medium specific gravity, and is free from adulterations, especially rosin, paraffin, fixed oils or gurjun balsam. This we can do reasonably well with tests at our command, including acid and saponification numbers, and specific tests for adulterations. The 1900 Pharmacopœia will incorporate the most reliable of these tests, and will establish standards of specific gravity, acid and saponification numbers, which we hope will prevent the sophistication of this substance.

In reply to a question by Mr. Chas. E. Caspari as to the specific gravity of the copaiba he found grossly adulterated, Mr. Dohme said it was .975. Mr. Caspari said the Pharmacopœia allowed a variation from .940 to .990. Mr. Dohme said it might be confined to a single point. This was originally a light copaiba, he said, made heavy by the addition of rosin, because it was desirable. Replying to a question by Mr. Hallberg as to whether that which was made heavy was what wholesalers call "solidifiable," the author replied in the affirmative.

Mr. Gane expressed doubt as to adulteration with rosin, because the price of Para copaiba was too high. The idea of adding rosin to Para balsam at the market price of 45 cents, with the view to making it heavy and more desirable, and selling at 28 cents, seemed an absurdity. He could understand that rosin might be added to a heavy balsam, but not to a light.

Mr. Chas. E. Caspari asked the author if he had come across any copaiba that ran as high as .990, the limit of the Pharmacopœia, and he replied in the affirmative. Replying to an inquiry by the same gentleman as to whether specific gravity was a good criterion, Mr. Dohme said "Not alone."

Mr. Kebler asked if there was not more trouble with adulteration in the use of the Para copaiba than with the oil of copaiba, which is much more expensive. Mr. Dohme said his idea was, that they simply take some light Para copaiba and make it heavy by putting some rosin in it.

On motion of Mr. Hallberg, the paper was received, and referred for publication.

Mr. Dohme then presented in abstract his paper on "Aloes and Aloin," as follows :

ALOE AND ALOIN.

BY A. R. L. DOHME AND H. ENGELHARDT.

Primarily, we took up this work to correct some erroneous impressions that may have been created by a paper recently published on this subject by H. J. Lohmann in the Druggists' Circular, and, incidentally, we extended it to an application of the very valuable paper on the same subject by Prof. Tschirch. Why pharmacists have for so many years held on to Socotrine aloes as the official aloes or the choice aloes is difficult to understand, when it is so easy to establish that it is the worst and least efficient aloes on the market. When we consider also the very much higher prices always asked for this Socotrine aloes and as regularly paid by the jobber and retailer alike, it seems a pity to have to chronicle the large amounts of money that have been wasted, not to mention the humiliation of having been duped so long and in two ways at that, viz., (1) by its intrinsic inferiority as a laxative, and (2) by the fact the little innocent island of Socotra never saw but a small fraction of what has been charged to its account. Lohmann applies a peculiar method for manufacturing aloin. He makes a solution of aloes in water, which is very difficult, with several kinds of aloes, as aloes is only partially soluble in water. This solution, which is in reality only a suspension, he pours into twenty times its volume of acidulated water and allows the mixture to stand for five or six days, when the aloin will have been precipitated, he says. The mother liquor he then removes and washes the precipitate with water until the filtrate no longer is colored. Unfortunately, this is completely wrong. By pouring the aqueous suspension of the aloes into the acidulated water, most of the aloin will stay in solution, and only a small amount will be precipitated along with a more or less inert resin. As Lohmann rejects the aqueous fluid and washes the resinous precipitate until it no longer is colored, *i. e.*, until all the aloin is washed out, the substance he determined as aloin is nothing but an inert resin without any appreciable amount of aloin. The color of this resin is different with the different kinds of aloes taken, and this accounts for the different colors which Lohmann's aloins showed, ranging from a light-yellow to a dark-brown. Aloin, by whatever method it may be prepared, is and should be a light-yellowish or light-olive substance, and not dark-brown. Lohmann prepared his so-called aloin by different methods, taking advantage in some cases of the relative great solubility of aloes in caustic alkalies. He disintegrates the aloes with the alkalies, caustic potash, ammonia or lime water, and pours this mixture into acidulated water. He further states that the solution should not be too acid, because in this case too much resin would be precipitated, and would contaminate the aloin. This is improbable for the same reason as given above. The resin (his aloin) will be precipitated, perhaps with a small amount of aloin, but most of the aloin will stay in solution. Aloin, especially nataloin, can be precipitated from its alkaline solution, but only

when fairly well concentrated. The results Lohmann gives are of no value whatever, for what he determines as aloin is everything but aloin. Whether he extracts aloes with water or alkali, and treats these results with acid, he should get in every case almost the same amount of aloin, because in all cases the mother liquor has the same composition, and the chlorides or sulphates formed by neutralization have no effect on the solubility of the aloin. Results, for example, as obtained for Socotrine aloes ranging from 0.73 per cent. to 28.53 per cent. are impossible as long as true aloin is determined. The different resins, of which aloes is composed, naturally act differently in the different solvents, etc., and this may account for these discrepancies. Lohmann further states that on treating aloin (very likely his preparation) with ether, emodin, which he calls active principle, is extracted to the amount of 5.66 per cent. This is impossible also, for while aloes contains some free emodin at times, this is very little, indeed, and aloin properly prepared does not contain any emodin at all. Aloin is a chemical individual, although there are several aloins derived from several kinds of aloes, and these probably form a homologous series. Whether Lohmann obtained emodin must be doubted very much for the reason just given. He does not give any reaction for identification. Lohmann quotes "The emodin (5.66 per cent.) can be withdrawn from the now *inert* resin." When Lohmann finds that his aloin, after removing an ether-soluble part, which he thinks to be emodin, is *inert*, he must admit that his substance is no *aloin*, because aloin is only sparingly soluble in ether, and must therefore remain undissolved but *active*. Aloin can be considered as the active principle of aloes, which is split up by the alkalinity of the intestines into emodin and other substances, the former causing the peristaltic effects. The small amount of emodin which is contained in a free state in aloes cannot figure at all in the therapeutic action of the drug. Lohmann's analyses hence have no value. About the same time that Lohmann's article appeared in the Druggist's Circular, an article by A. Tschirch,* on the "Valuation of Aloes," was published. Among the numerous methods given for determining the value of aloes, there is hardly one reliable, so that given by Tschirch was tried. The method depends on the determination of the methyl-alcohol chloroform soluble matter of the aloes. This menstruum dissolves aloin and several more or less active resins, but leaves undissolved all the inert resin. The method is carried out as follows: 5 Gm. of the powdered drug are macerated for 12 hours with 5 Cc. of methyl-alcohol, heated at 50-60° C. for a short time, and shaken well with 30 Cc. of chloroform. After allowing to stand for a few minutes, the fluid is filtered into a tared Erlenmeyer flask, and the menstruum distilled off. The undissolved part of the aloes is then shaken again with the distillate, the fluid filtered into the Erlenmeyer flask, dis-

* Pharm. Post, 37, page 265.

tilled off again and this process repeated twice more. Finally, the contents of the flask are dried to a constant weight. The weight found multiplied by 20 gives the percentage of methyl-alcohol-chloroform soluble matter. Four samples of aloes were examined :

- (1) Curaçao Aloes.
- (2) Socotrine Aloes (a partly soft substance).
- (3) Cape Aloes, and,
- (4) Curaçao Aloes No. 1, from which about 14 per cent. of aloin had been previously extracted. This preparation was used to see whether this method applies to an aloes with a low percentage of aloin as well as to one with a high percentage of aloin. The results obtained by this method were as follows :

- I. 69.5 per cent. methyl-alcohol-chloroform soluble substance.
70.0 per cent. methyl-alcohol-chloroform soluble substance.
- II. 62.8 per cent. methyl-alcohol-chloroform soluble substance.
64.18 per cent. methyl-alcohol-chloroform soluble substance.
- III. 68.02 per cent. methyl-alcohol-chloroform soluble substance.
66.5 per cent. methyl-alcohol-chloroform soluble substance.
- IV. 60.44 per cent. methyl-alcohol-chloroform soluble substance.
60.8 per cent. methyl-alcohol-chloroform soluble substance.

Tschirch claims that most of the residues obtained by this process were of a light yellow color ; this, however, was only the case with No. III ; all the others were more or less brownish-colored. These results in Nos. I and IV are dissatisfying, as No. IV ought to give a larger amount of methyl-alcohol-chloroform insoluble resin, being prepared from No. I by extraction of a part of its aloin. The results are of a relative value, giving only the amount of perfectly inactive resin. Tschirch gives then a method for determining the aloes in such methyl alcohol-chloroform extracts, which method was tried on the aloin in question, and gave very satisfactory results. The method is based on Schouteten's reaction, namely : that aloin gives with concentrated borax solution a yellow liquid, which, after a short time, assumes a vivid green fluorescence. By the intensity of the fluorescence, the concentration of the solution, *i. e.*, the amount of the aloin dissolved in it can rather exactly be determined. A solution of pure aloin 1 Gm. in 10,000 Cc. of borax solution is strongly fluorescent ; a fairly strong fluorescence is noticed when diluted to 100,000 ; a weak fluorescence appears when diluted to 1 : 200,000, and when further diluted to 1 : 250,000 the fluorescence can only be observed when the fluid contained in a test-tube in a layer 12 Mm. thick is viewed with reflected light against black paper. When diluted still further, no more fluorescence is noticeable. The limit of sensibility is therefore at 1 : 250,000. A solution of aloin in borax solution 1 : 250,000 therefore forms a normal solution. To determine the amount of aloin in the above residue from methyl-alcohol-

chloroform extracts, the residue was treated several times with hot water to dissolve all the aloin, and the aqueous solutions without filtering were transferred to a 1000 Cc. flask. Then 400 Cc. of a cold saturated borax solution were added and the fluid made up with water to 1000 Cc. This solution, which was strongly fluorescent, was diluted still further by diluting 1 Cc. with 50, 75 and 100 Cc., etc. of water. The results were the following :

The fluorescence ceased to appear when diluted to

I to 212,500.

II to 125,000—137,500.

III to 150,000.

IV to 37,500 to 50,000.

Or calculated for aloin in the aloes :

I. 17 per cent.

II. 10-11 per cent.

III. 12 per cent.

IV. 3-4 per cent.

The results allow a much better judgment of the value of aloes than the determination of the methyl-alcohol-chloroform soluble matter. The difference between the amount of aloin in No. I and No. IV is plainly shown.

By numerous experiments, Tschirch further has shown that methyl-alcohol-chloroform extract besides aloin contains to 50 per cent. a substance which yields, on oxidizing with nitric acid, chrysaminic acid, and is, therefore, very nearly related to the anthraquinones and probably in some way active also.

This determination was not made with the aloes in question, but taking Tschirch's results as right, the aloes examined would be composed of

	I.	II.	III.	IV.
Inert resin.....	30.5 per cent.	37.2 per cent.	31.98 per cent.	39.56 per cent.
	30 per cent.	35.82 per cent.	33.5 per cent.	39.2 per cent.
Aloin.....	17 per cent.	10-11 per cent.	12 per cent.	3-4 per cent.
Anthraquinone yield-				
ing subst.	26.5 per cent.	27 per cent.	28 per cent.	28.75 per cent.
Other resins	26.5 per cent.	27 per cent.	28 per cent.	28.75 per cent.

Of all the aloin determinations, that depending on Schouteten's reaction gave the most satisfactory results. To prove the accuracy of the determination of aloin by the borax method, the aloin in No. I was determined by the following process :

25 Gm. of aloes were disintegrated with 50 Cc. of hot water, the mixture heated on a water bath until all the lumps had disappeared, and then poured into 100 Cc. of 1 per cent. hydrochloric acid. After the precipitated resin had separated perfectly (after about 12 hours), the fluid was separated and evaporated under diminished pressure to about 40 Cc. This concentrated fluid was transferred to a wide-mouth bottle of such a size

as to be nearly filled up with the fluid (to avoid the aloin from coming in contact with air and to prevent oxidation) and then put into ice water. After standing for about 24 hours, the aloin crystals were filtered with the aid of an air-pump, the crystals washed with a little ice-cold water and then dried in vacuo. The yield was 4 Gm. = 16 per cent. of aloin in the aloes.

The result is about 1 per cent. lower than that found by the borax method; but all the determinations based on a crystallizing process (morphine, etc.) give somewhat lower results, as some of the substances to be determined always stay in solution even when highly concentrated.

After some discussion by Messrs. Sayre, Hallberg, Wilbert and C. E. Caspari as to the propriety of the personal allusions made in the paper, the latter was, on motion of Mr. Sayre, received and referred for publication.

Mr. Dohme then presented in abstract his paper on acetic acid extracts, the full text of which here follows:

ACETIC ACID EXTRACTS.

BY A. R. L. DOHME.

For some years efforts have been made to cheapen the cost of fluid and solid extracts of vegetable drugs by the use of acetic acid, more or less diluted, as a menstruum. I say "cheapen" advisedly, because I believe that this is the main object to be accomplished for this innovation. To be sure, it has been claimed that alcohol is undesirable in these preparations to the physician and patient and that special remedial agents or correctives have to be administered to offset the alleged injurious effect of the alcohol. No doubt some physicians and some people confidently believe this to be generally true, just as some people think that any beverage containing alcohol is a dangerous and deleterious thing. These people are entitled to their opinion, but being in the enormous minority, they cannot be said to wield any power or carry any conviction. In my opinion the contrary is more nearly true as regards medicine, viz.: that the alcohol is almost always, except in a few special diseases or causes, a desirable addition to a medicine administered to a patient, because stimulation and consequent exhilaration are large factors in curing many ailments. My purpose in introducing this alcohol question is to point out that in the last analysis the question of price is at the bottom of the acetic extract. The prime difference between the acetic and alcoholic fluid menstruum is that the former does not extract oils and fats, and the latter does not extract gums, starches, pectins, etc. Both extract the active principle of many drugs equally well, acetic acid not of all drugs, but alcohol of all drugs. Advantage for alcohol. Whether or not it is an advantage to have a fluid extract free of a few oils and fats, but filled to overflowing with inert extractive matter, is not an open question, in my mind, although it may be to some other minds. I am prepared to prove to the satisfaction of any one that if an acetic fluid extract and an alcoholic fluid extract

of the same drug are made in the same way, the acetic acid extract will deposit more copiously than the alcoholic extract. Advantage 2 for alcohol. Again, a comparison of these two fluid extracts as to their palatability, appearance, availability for dispensing with other drugs, and compatibility with other drugs, will result decidedly in favor of the alcoholic preparation, for (1) an acetous smell and taste is not agreeable to most patients; (2) a dense, oftentimes syrupy, liquid is not as elegant in appearance as a mobile, less dense liquid; (3) a fluid extract less heavily charged with extractive, will not be as capable of admixture to aqueous or alcoholic liquids or other solid ingredients as a mobile, less heavily charged fluid extract; (4) the acid character and reaction of such an extract will introduce far more incompatibilities than a neutral alcoholic or aqueous alcoholic liquid. And, right here, from a practical standpoint, arises one of the main difficulties of the acetic extract. If acetic extracts should become official and druggists dispense them, how will they be able to dispense repeated prescriptions that had for years been dispensed with alcoholic fluid extracts? Either the physician will have to write a new prescription, which is not always possible, as the physician may be dead or not available, or the druggist will have to carry a line both of alcoholic and acetic fluid extracts. It has been claimed that the objectionable features of acetic extracts can be overcome by treating them with alcohol and thus precipitating all the inert extractive, but if alcohol is to be added eventually, what is the use of first extracting with acetic acid, and where does the saving both in labor, time and money come in? For those drugs that contain oils, such as seeds especially, acetic acid makes an effective menstruum, since the oils remain in the drugs, but methods are available to experienced pharmacists for obviating this difficulty while still using the alcoholic menstruum. The writer recently pointed out to the chairman of the sub committee on fluid extracts, how, in case of glycyrrhiza, it is possible to entirely avoid getting any of the undesirable acid, bitter principle, and yet produce an efficient alcoholic fluid extract of this drug, and, in the same way, methods are known and used for preparing fluid extracts of oily drugs without getting any oil into the fluid extract and yet producing an alcoholic fluid extract. The only advantage thus far given for acetic acid is hence shown not to be an advantage after all. Another disadvantage to the pharmacist in making acetic fluid extracts is the fact that maceration of many drugs with acetic acid causes them to swell to such an extent, even if in coarse powder, as to choke up the percolator and render percolation very difficult and tedious. Some experiments were recently made in my laboratory to discover if acetic acid destroyed any of the active principles of the drugs when used as a menstruum for making fluid and solid extracts, and I give below the results obtained:

Belladonna Leaf.—100 Gm. in No. 20 powder, assaying 0.57 per cent. total alkaloids were exhausted with 850 Cc. of 10 per cent. acetic acid,

resulting in a dense, brown liquid, with a sp. gr. of 1.13. The fluid extract was found to contain 0.54 per cent. total alkaloids, showing little or no loss of alkaloid. 100 Gm. of the same fluid extract were evaporated on a water-bath to a solid extract, and yielded 35 Gm. thereof, or 35 per cent. extractive. (The official menstruum seldom extracts more than 25 per cent.) This extract yielded 1.47 per cent. of total alkaloids, or 0.52 per cent. of the drug. This shows a loss of 0.05 total alkaloids, *i. e.*, 10 per cent.

Colchicum Seed.—100 Gm. in No. 20 powder assaying 0.41 per cent. colchicine were exhausted with 800 Cc. of 10 per cent. acetic acid, resulting in a heavy brown liquid sp. gr. 1.098. This could be assayed in the usual way, but the inert matter had first to be precipitated by alcohol. The fluid extract assayed 0.41 per cent. colchicine, showing no loss of alkaloid. 100 Gm. of this fluid extract were evaporated on a water-bath, and gave 23 Gm., or 23 per cent. of solid extract (the alcoholic menstruum yields 15 per cent.), assaying 1.65 colchicine. This when referred to the drug equals 0.38 per cent. colchicine, showing a loss of 0.03 per cent. colchicine, *i. e.*, 8 per cent.

Digitalis.—100 Gm. in No. 20 powder assaying 0.42 per cent. digitoxin by Keller's method were exhausted with 900 Cc. of 10 per cent. acetic acid, resulting in a heavy brown liquid, sp. gr. 1.176, assaying 0.35 per cent. digitoxin, and showing loss of 0.07 per cent., *i. e.*, 16 per cent. 100 Gm. of this fluid extract gave 47 Gm. of solid extract on evaporation, or 47 per cent. of extractive, an enormous percentage necessarily resulting in a weak extract. (The official menstruum yields 25 per cent.) This extract assayed 0.52 per cent. digitoxin, or when referred to the drug, 0.24 per cent. digitoxin, showing a loss of 0.18 per cent. digitoxin, or 42 per cent. of the digitoxin has been lost. This indicates very strongly that acetic acid hydrolyzes some of the digitoxin, and hence is no fit menstruum for the same.

Lobelia.—100 Gm. in No. 20 powder, assaying 0.45 per cent. lobeline ($C_{18}H_{23}NO_2$) were exhausted with 800 Cc. of 10 per cent. acetic acid, resulting in a heavy brown liquid sp. gr. 1.117, and assaying 0.39 per cent. lobeline. The loss here was 0.06 per cent., or about 14 per cent. 100 Gm. of the fluid extract were evaporated to a solid extract, and gave 30 Gm. of the same or 30 per cent. of extractive. (The official menstruum yields 25 per cent.), assaying 1.03 per cent. lobeline, or when referred to the drug, 0.310 per cent. lobeline, showing a loss of 0.14 per cent. lobeline, *i. e.*, 35 per cent. Here also acetic acid apparently decomposes some of the lobeline, indicating its unfitness as a menstruum.

It is a peculiar but very suggestive fact that practically all the leading pharmaceutical manufacturers of this country are a unit against the use of acetic acid as a menstruum for fluid extracts after careful experiments in many cases as to its availability. Certainly, if acetic acid would answer

as well and serve pharmacists as well at his dispensing counter, is it reasonable to presume that with its great cheapness as compared with the 1000 per cent. taxed alcohol and their exceptional facilities for their experimentation in the laboratory, and on the large scale practically that these manufacturers would not have adopted it long since, if it had any merits practically or scientifically?

The paper was discussed by Messrs. Kremers, Hallberg, C. Caspari and Dohme, and was then referred for publication, on motion of Mr. Kremers.

Mr. Dohme then abstracted his paper on fatty oil of mandrake, explaining that the work had not progressed far enough to read a full paper on it, but he would make a few statements anyhow, in the form of a preliminary paper, in the hope that others might become interested in the subject. The text of his paper here follows:

THE FATTY OIL OF MANDRAKE (*PODOPHYLLUM PELTATUM*).

PRELIMINARY PAPER BY A. R. L. DOHME AND H. ENGELHARDT.

There is comparatively very little known about this substance; it is described as a "yellow thick oil," without any further details about its properties and chemical composition.

As large quantities of podophyllin are manufactured in the laboratories here, we had occasion to collect a considerable quantity of the oil. We undertook a study of this, which, unfortunately could not be completely finished, owing to the lack of time; however, we expect shortly to report about further results.

When mandrake is exhausted with a suitable solvent, and when this solution is evaporated to a proper consistency, occasionally a thick oil separates on the surface of the liquid, at times to an extent of 0.5 per cent. of the weight of the drug used. Very often, however, no oil is obtained at all; the drug, therefore, must be very variable in the amount of oil present, the oil occurring as well in fresh as in well-seasoned root.

The oil, as obtained directly by the process mentioned above, formed a heavy liquid, dark green in color, and having a specific gravity of 0.9989. This oil is mixed with water and some of the solvent used, since the specific gravity is reduced to 0.9753 when the oil is heated on a water-bath for about six hours to a constant weight. On prolonged heating, or on standing in the air for several days, solid matters separate, and gradually the oil dries, thus indicating that at least a portion of the oil belongs to the series of drying oils. Efforts to distill the oil gave negative results, as it is decomposed when heated, even under diminished pressure. A portion of the oil was heated with steam, as well as with superheated steam, but in both cases only a very small amount of the oily substance was obtained in the distillate, which shows that only a trace of a volatile oil is present. The distillate was slightly acid, which would indicate that traces of a vola-

tile acid are present also. But of both substances the quantity was so small that identification was impossible.

The oil liberated from the admixtures consisting of water, solvent, etc., by heating six hours as mentioned above, was nearly perfectly soluble in alcohol, ether, chloroform and benzene, but only partly soluble in petroleum-benzin. When mixed with about four times its volume of the last mentioned solvent, a heavy flocculent precipitate separated, after allowing the mixture to stand for about one day. When more than four parts of petroleum-benzin are added, the separation of the precipitate is accelerated. This partial solubility of the oil in petroleum-benzin can therefore be used for separating at least one substance from the oil. For this purpose the oil was dissolved in about three times its volume of chloroform, and this solution poured drop by drop with constant stirring, in about twenty times its volume of gasoline. A fine flocculent precipitate was formed, which quickly subsided, forming a resinous mass. Although this substance was redissolved and reprecipitated several times, no appreciable purification could be noticed. As all the efforts to obtain this substance in a crystalline or pure form (by allowing it to crystallize from solutions in alcohol, diluted alcohol, glacial acetic acid, etc.) failed, we expect to try to make derivatives of the substance, and by these prove the identity of the body. The substance, when freshly precipitated, forms a straw-yellow mass, which, on standing or heating in the open air, quickly assumes a dark color, probably due to oxidation.

The substance must have an indifferent character, because its elimination does not affect the acid- and iodine-numbers of the oil, and has a slight influence only on the saponification number as given below. This gasoline-insoluble body amounts to 10 per cent. of the oil. The gasoline-chloroform solution, when evaporated, yielded a dark-green oil, slightly less viscid than the original oil. The following constants for the two oils were found :

	Oil heated for six hours.	Oil heated for six hours, and deprived of the solid substance.
Specific gravity.	0.9753	0.952
Acid number	{ 40.6 41.0	40.2 39.9
Saponification number.....	{ 185.4 182.7	160.5 159.0
Iodine number.....	{ 101.0 99.6	107.4 106.8

For the saponification of the oil, the body insoluble in gasoline was first removed, as this substance possesses, as stated above, an indifferent character. Being unsaponifiable, it would tend to render the isolation of the product of the saponification more or less difficult, owing to its solubility in ether.

100 g. of the caustic potash were dissolved in 1600 Cc. of alcohol, mixed with 400 g. of the oil, and the mixture heated for three hours on a water bath, in a flask provided with a reflux condenser. The alcohol was then distilled off completely; the residual soap dissolved in water; and the aqueous solution repeatedly shaken out with ether. An emulsion, which frequently forms, can be broken up easily by the addition of a little alcohol. It may be mentioned here that the method, often recommended, to mix the soap with sand, evaporate this mixture to dryness, and extract the dry residue with ether in a Soxhlet apparatus, did not work as well as that just mentioned, or as the following one, which was applied also. The potassium soap solution is treated with a solution of chloride of calcium as long as a precipitate is formed with constant stirring and the mixture evaporated to dryness. The dry residue is then repeatedly extracted with ether.

In every case the ethereal solution is evaporated to dryness, when an oily liquid is left, which quickly solidifies. As this residue might be contaminated with some unsaponified oil, it was dissolved again in alcohol, and the alcoholic solution treated once more with a small quantity of alcoholic caustic potash for one hour. The alcohol was then distilled off again, the residue taken up in water, and the aqueous liquid exhausted with ether. The ethereal solutions were then shaken several times with water, to remove any soap which might have been dissolved by the ether; then the ethereal solution was evaporated to dryness. The residue left on evaporation was crystallized from hot alcohol, in which the substance was rather difficultly soluble. On cooling, beautiful white plates separated from the solution, which, when twice more recrystallized from the same menstruum, melted at 134° , and showed all the reactions of Phytosterine $C_{28}H_{44}O + H_2O$. An analysis of this substance will follow later. The alcoholic mother-liquid yielded, when more concentrated, a substance which separated in prism-like shape. After repeated recrystallization, small white crystals were formed, which melted at 118° . The reactions which this substance gave, differed greatly from those given by the first crystallization product. When heated with concentrated sulphuric acid, phytosterine gives a red color; the color produced by this substance was rather an orange than a red. When dissolved in chloroform, and then shaken with concentrated sulphuric acid, phytosterine imparts to the chloroform a deep red color, while the yellowish-colored sulphuric acid shows a greenish-yellow fluorescence. With this substance, the sulphuric acid is colored red, while the chloroform is colored yellowish-green. If phytosterine be mixed in a porcelain dish with a small amount of ferric chloride, hydrochloric acid and chloroform, the mixture then heated almost to dryness, then allowed to cool, and then after the addition of more chloroform, evaporated again to dryness, the residue will assume a violet color, changing to blue-violet, dirty green. The substance obtained in the sec-

and crystallization showed only a violet color, without any change to green. Up to the present time we have not been able to identify this substance, but we are inclined to believe that it is a cholesterol- or phytosterine-like body, as color reactions like the above-mentioned are seldom observed with the true alcohols.

After these substances had been separated, the soap solution was heated to expel the ether, and, after cooling, treated with diluted sulphuric acid. A heavy precipitate was formed, which agglutinated, and floated on the surface of the fluid as a semi-solid mass. The mixture was then heated on a water-bath, and, after cooling, the aqueous fluid was separated by filtering from the resinous mass. The latter was washed twice more with slightly acidulated water.

To separate the fatty acids, they were suspended in water, exactly neutralized with alkali, and then precipitated with lead acetate. The lead soaps thus obtained were washed well with hot water, and, after cooling, deprived mechanically of as much moisture as possible. It was noticed that the lead salt quickly changed the color from a grayish to a brownish hue, very likely due to oxidation. This change of color occurred again in the further manipulations which we made to isolate the liquid fatty acids. We therefore intend to make further experiments in an atmosphere of hydrogen gas, to prevent any oxidation. The separation of oleic acid from the stearic and allied acids is carried out usually by Varrentrapp's method, *i. e.*, the lead salts are treated with ether, in which the lead salts of oleic acid and its related compounds are soluble. We abandoned this method, as it is stated generally that in presence of much oleic acid, a considerable part of the lead salts of the solid fatty acids is dissolved also. We applied the modification of Farnsteiner,* who uses benzene instead of ether. The lead salts were dissolved in hot benzene and then cooled to 8–10° C. The lead salts of oleic acid, etc., will remain in solution, while those of the solid fatty acids crystallize out. The benzene solution, which had acquired a dark color in a very short time (very likely by the above mentioned oxidation) was poured off, and the residue treated twice more with benzene in a similar way.

To the combined benzene solutions an excess of sulphuric acid was added, the mixture was well shaken, and then was allowed to clear. The benzene was then evaporated, and an oily, dark-colored liquid was left, from which a crystalline body separated after some time. This was removed as well as possible by filtering with pressure. The oily filtrate, when assayed by Hübl's method, showed the iodine number 74 (76), while the theoretical iodine number for oleic acid should be 89. The low number must be due to some oxy-oleic acid.

By far the greater part of the lead soap is soluble in benzene; the fatty

* Zeitschrift für Untersuchung der Nahrungsmittel, 1898, 390.]

acids, therefore, are composed mostly of oleic acid and its homologues. For the separation of the higher unsaturated acids, linoleic acid, etc., which very likely are present (as the oil dries out when exposed to the air) we used a method proposed by Farnsteiner (*Zeitschrift für Untersuchung der Nahrungsmittel*, 1899), which depends on the treatment of the barium salts of the fatty acids with benzene containing 5 per cent. of alcohol, in which the salts of the acids of the linoleic acid series are soluble. No definite results have as yet been obtained.

That part of the lead soap, which was insoluble in benzene, was filtered and heated with diluted sulphuric acid in the presence of benzene. After cooling, the benzene solution was filtered and evaporated. An oily residue was left which quickly solidified, and, after repeated recrystallization from alcohol, gave fine white needles, melting at $52-53^{\circ}\text{C}$. The melting-point shows that this acid is neither palmitinic nor stearic acid. From the mother-liquid, crystals of a different shape seem to evaporate, but these have not been examined as yet.

In assaying these acids we made use of a method originated by F. Kraft, which is carried out as follows:

The acid is dissolved in an excess of ammonia water, and to this solution a sufficient quantity of ammoniacal silver solution is added. If a precipitate should be formed, it may be brought into solution again by the addition of more ammonia. To this solution sufficient water is added to make the silver salt separate, and ball together on stirring, while the supernatant fluid should remain clear. The salt is then filtered, washed well with water, and dried in vacuum. The determination of the silver is then carried out in the usual way. No definite results have as yet been obtained. The determination of the silver salt is more convenient than that of the barium salts (which usually is applied), because the silver salts can be more readily made and purified than the other salts.

The acid solution, separated from the fatty acids, contained glycerin; the solution was shaken out repeatedly with ether, which, on evaporation, left a reddish, oily substance, with an odor resembling that of valerianic acid. The yield was a small one only. Acetic acid was proven to be absent. This oily liquid had an acid reaction. When neutralized with ammonia, on addition of silver nitrate solution a heavy whitish precipitate was formed which, however, almost instantly blackened. The presence of some aldehyde or aldehyde-like body is therefore very likely denoted. As soon as we shall have obtained more of this substance, we will make further investigation of it. Whether or not this body exists as such in the oil, or is formed by oxidation of the oil, is a question. Many oils give, when oxidized, valerianic acid and similar compounds.

In conclusion, we wish to say that as soon as time permits we shall continue these investigations, and we hope in the near future to clear up all those points which we had to leave as doubtful.

Mr. Hallberg thought it important to know the age of the drug examined by the author, as it is well known that podophyllum shows an increase of resin with age, and it is the custom of manufacturers to mature the drug by storing for two or three or four years before using. Mr. Dohme said the age of the drug in this case was one year and a half, gathered last fall a year ago; it showed no green color, and was very brittle. He proposed, however, to examine a fine specimen gathered last spring for a comparison of results.

After some further remarks by Messrs. Kremers and Gane, on motion of Mr. Hallberg, the paper was received and referred.

On motion of Mr. Caspari, the Section then adjourned to meet on Friday morning at 10 o'clock.

SECOND SESSION—FRIDAY MORNING, SEPTEMBER 9, 1904.

Chairman Puckner called the Section to order at 10 o'clock.

On motion of Mr. Roehrig, the reading of the minutes of the first session was dispensed with.

The Chair called for further nominations for officers of the Section, and stated that Mr. E. H. Gane, of New York City, was the only nominee thus far for Chairman, and Mr. Chas. E. Caspari, of St. Louis, the only nominee for Secretary. On motion of Mr. Wilbert, nominations for both offices were closed, and the Chairman was requested to cast the ballot of the Section electing these gentlemen to the places indicated. This was done, and the Chair declared Messrs. Gane and Caspari elected Chairman and Secretary respectively.

The Committee on Chairman's Address not being ready to report, and there being no other committee reports or incidental business, the Chair called on Mr. H. M. Gordin to read his paper on Calycanthine, which the gentleman presented in abstract, exhibiting some specimens of the drug, the full text of the paper being as follows:

ON THE ALKALOID CALYCANTHINE.

BY H. M. GORDIN.

(First Paper.)

The seeds (achenes) of *Calycanthus glaucus* were examined for the first time by R. G. Eccles.* He found in them more than 33 per cent. of oil and a peculiar alkaloid of which he described several color reactions and which he named calycanthine. Later Prof. H. W. Wiley worked on the same subject,† examining both the oil and the alkaloid. As considerable time has elapsed since the work of these chemists had been done I under-

* Proc. Am. Phar. Assoc., 188, 84 & 382.

† Am. Chem. Jr., 1889, 557.

took the investigation of the subject, intending to examine the alkaloid, the oil and also the acid or acids which are combined with the calycanthine in the drug. In the present paper I shall report upon some results which I have so far obtained in the examination of the alkaloid, leaving further work upon calycanthine and the other constituents of the drug for my next paper, which I hope to have ready very soon.

As a complete description of *Calycanthus glaucus* is given in the above-mentioned articles of Eccles and Wiley, I shall refer the reader to these articles for the description of the drug, and pass directly to the method by which the oil, the acid or acids and the alkaloid can be isolated.

The first step in the work was to establish by assay the amount of alkaloid present in the drug, and then find by experiment the best method which would give results approximating those of the assay. It was found that cold alcohol extracts only about 29 per cent. of the alkaloid, whereas hot alcohol takes out about 75 per cent. The assay was carried out by means of Prollius' fluid in the usual way. A considerably larger yield can be obtained by moistening the deoleated drug with aqueous ammonia and extracting with ether or chloroform.

But as it was desirable to obtain both the alkaloid and the acid or acids with which it is combined in one operation, the hot-alcohol method was decided upon. As to acidulated aqueous solvents they were not used partly because it was deemed desirable to avoid the use of acids with an alkaloid of unknown stability and partly because in the presence of water the extract is so thick and turbid that it becomes very difficult to handle larger quantities. The method I have used then, is as follows :

The seeds are ground up very coarsely and completely exhausted with benzol or petroleum ether. All the oil is in this way taken out, leaving the alkaloid behind. The oil can then be obtained by distilling off the solvent. After the removal of the oil, the drug is dried at ordinary temperature till the odor of benzol or the petroleum ether disappears. The drug is then again ground, but this time to a very fine powder, and then exhausted with hot alcohol till the percolate gives no reaction for alkaloid with Mayer's or Wagner's reagents. From the alcoholic extract the alcohol is distilled off completely and the residue taken up with cold water slightly acidulated with sulphuric or hydrochloric acids. A brown flocculent precipitate is formed, consisting of the acid or acids with which calycanthine is combined in the drug, mixed with some calcium sulphate if sulphuric is used, and colored by resinous matter. All the alkaloid goes into the aqueous solution as a sulphate or a hydrochloride. After separating the insoluble, impure acid by filtration, the clear, dark filtrate is made alkaline with potassium hydrate and the dense precipitate which is formed, consisting of impure calycanthine, collected on a filter. After washing the precipitate with water it is dissolved in very dilute sulphuric acid, the liquid filtered and again made alkaline with potassium hydrate. The pre-

precipitate, which is now of a very light color, is dried at a temperature of about 40° to 50° and then dissolved in about ten times its amount of acetone. A good deal of non-alkaloidal matter is left behind, whereas all the alkaloid goes into solution.

After filtering the acetone solution a previously-prepared and cooled mixture of one part sulphuric acid and five parts alcohol is added to the filtrate till no more precipitation takes place. The alkaloid sulphate which is formed is almost completely insoluble in the acetone-alcohol mother liquor and completely insoluble in pure acetone. The sulphate thus obtained is crystalline and almost perfectly white. After washing the sulphate with acetone it is again dissolved in water, the liquid, if necessary, filtered and the alkaloid reprecipitated by ammonia. It is now distinctly crystalline and is almost snow-white. For further purification it is again dissolved in very dilute hydrochloric acid, the liquid digested with animal charcoal, filtered, and the alkaloid again precipitated by ammonia. This last operation is repeated till the alkaloid gives a perfectly colorless solution with very dilute acids. It is then precipitated with ammonia, the precipitate dried at a low temperature (about 40° to 50°) and recrystallized from a mixture of acetone and water or from alcohol till constancy of melting-point.

The amount of crude calycanthine obtained by this method is about 1.5 per cent., but that the drug contains a little over 2 per cent. of alkaloid was established by assay. About 25 per cent. of the alkaloid is, therefore, lost in the operations.

Calycanthine crystallizes from alcohol in large cubes having a glassy appearance. From acetone and water it crystallizes in much smaller crystals which can be seen under the microscope to have the same form. It melts at 243° – 244° . It has a bitter taste and a slightly alkaline reaction towards litmus. It is very little soluble in water, slowly but completely soluble in about 25 parts hot alcohol, quite soluble in ether or chloroform, almost insoluble in benzol and quickly soluble in about ten parts of acetone. The exact solubilities in various solvents will be determined later on. It forms beautifully-crystalline salts with all acids so far tried. The sulphate, hydrochloride and acetate are extremely easily soluble in water. The hydriodide and the nitrate are much less so. The hydrochlorate dissolves in about 15 parts of hot alcohol, the sulphate is very difficultly soluble in hot alcohol. The aqueous solutions of calycanthine sulphate and calycanthine hydrochloride are strongly acid to litmus paper showing the alkaloid to be only weakly basic. The alkaloid contains no water of crystallization, neither does its sulphate. The hydrochloride contains water of crystallization which is quickly given off even at ordinary temperature. The sulphate and the hydrochloride can be easily made by dissolving calycanthine in acetone and adding a mixture of the corresponding acid and alcohol or water. The yield is larger when alcohol is

used because alcohol is a poorer solvent for the salts than water. If the hydrochloride is recrystallized from hot alcohol it forms large heavy prisms having a vitreous appearance. If these crystals be put into a desiccator over sulphuric acid they soon become white and either fall to a fine snow-white powder or they do so upon the slightest touch. Calycanthine also forms a chloroplatinate which crystallizes from boiling water acidulated with hydrochloric acid in beautiful prismatic crystals. They are very difficultly soluble in cold water, a little more soluble in hot water. The chloroplatinate begins to darken at 221° . On further heating it becomes darker and darker and at 250° it is perfectly black. Owing to the dark color no exact melting-point could be determined.

Calycanthine also forms a double salt with gold chloride when the latter is added to a cold solution of calycanthine hydrochloride in water strongly acidulated with hydrochloric acid. The double salt immediately crystallizes out in soft, silky needles of a light brown color. The gold salt cannot be recrystallized from any solvent so far tried. Water not containing hydrochloric acid decomposes it very quickly even in the cold with the separation of gold, the liquid assuming a beautiful purple color. The gold salt is very easily soluble in alcohol but on evaporation of the solvent the double salt is partly decomposed. It is insoluble in ether. When calycanthine chlorate is dissolved in alcohol in the presence or absence of hydrochloric acid and ether added to the solution, beautiful, long, silky needles soon commence to form. These needles upon examination were found to be not the gold salt but calycanthine hydrochlorate. This was shown by the fact that the needles were white, extremely easily soluble in cold water and completely combustible without residue. It would seem that under the conditions of the experiment the gold salt of calycanthine behaves like some double salts, not like a complex salt,* so that upon the addition of ether the gold chloride goes into solution, leaving the very difficultly-soluble calycanthine hydrochlorate to crystallize out. Upon heating, the calycanthine chloraurate becomes dark-brown at 197° . On further heating it slowly divides itself into two parts: an upper part which shrinks away from the sides of the tube, has a dark-chocolate color, a shiny appearance and an ellipsoid form, and a lower part which retains the brown color and adheres to the sides of the tube. Up to 290° it remained unchanged.

Following is a list of color reactions which can be used for the identification of calycanthine:

1. If to a trace of calycanthine dissolved in the very dilute hydrochloric acid a drop or two of a 5 per cent. gold chloride solution be added and the liquid made alkaline with sodium carbonate, a beautiful purple color is produced immediately showing that the gold salt is quickly reduced.

* See Ostwald, *Grundlinien der anorg. Chem.*, 1ste Auflage, 544.

The value of this reaction consists in the promptness and extreme delicacy with which it occurs. While many alkaloids reduce gold salts in alkaline solution, I do not know of any other alkaloid that causes the reduction so quickly and in such extreme dilution. The reaction with calycanthine takes place with one part of calycanthine in a million parts of water.

2. Bromine water is first decolorized by a solution of calycanthine hydrochloride. If excess is added, a yellowish, flocculent precipitate is formed. If the addition of bromine water be stopped with the first appearance of a precipitate and the liquid filtered, a clear, colorless liquid is obtained which has a bluish fluorescence. If potassium hydrate is added to this filtrate a bulky, white precipitate is formed, which is insoluble in water and becomes gray when dried in the air.

3. Mayer's reagent gives a white, flocculent precipitate. Wagner's reagent gives a resinous precipitate. Tannic acid gives no precipitate either in neutral or acid solution. Marmé's reagent gives beautiful snow-white needles.

4. When Mandelin's reagent is put into a porcelain dish and a trace of calycanthine thrown upon the liquid, a magnificent blood-red color is produced. After a few minutes the margin of the liquid assumes a green tint.

5. Potassium ferricyanide gives a white precipitate in concentrated solutions of calycanthine salts, but the precipitate dissolves when more water is added.

6. Potassium ferrocyanide behaves like the ferricyanide, but on heating the dilute solution of calycanthine hydrochloride to which some potassium ferrocyanide had been added, the clear liquid becomes turbid and assumes a greenish tint. After a few minutes a slimy precipitate separates out which is very difficultly soluble in water or alcohol.

7. On adding to a dilute solution of calycanthine hydrochloride a few drops of ferric chloride and then some potassium ferricyanide, Prussian blue is formed in a few minutes from the reduction of the ferri- to the ferro-salt.

8. Sulphuric acid colors calycanthine slightly yellow. If a few crystals of sugar be added to the mixture of the alkaloid with sulphuric acid, a beautiful pink color is produced.

9. Mercuric chloride gives a precipitate difficultly soluble in cold water, quite soluble in hot water, from which long, white needles separate out on cooling.

10. When calycanthine is heated to boiling for one hour with dilute hydrochloric acid the liquid soon becomes yellow, but has no odor. If the acid liquid is set aside it becomes darker and darker. After ten days it becomes very dark-red, but still has no odor. From this dark solution potassium hydrate precipitates a yellow, flocculent precipitate insoluble in water or alkalies, extremely easily soluble in dilute acids and alcohol. The yellow substance assumes a very agreeable odor when warmed with potassium hydrate. Its solution in acids has no odor.

11. Nitric acid brought in contact with calycanthine gives a beautiful green color.

12. Froehde's reagent colors calycanthine yellow at first, but the color becomes darker and darker on standing, till after about an hour it is almost red.

13. Picric acid gives beautiful, slender needles difficultly soluble in cold water, easily soluble in hot water.

14. Sulphuric acid and potassium dichromate give a rose-red color.

Of the reactions here enumerated, those with nitric acid, sulphuric acid and sugar, sulphuric acid and dichromate were already observed by Eccles.

In order to establish the chemical formula of calycanthine several combustions of the alkaloid and analyses of its salts were made, but as this part of the work is not finished yet I shall report the results in the next paper.

In order to test the physiological activity of calycanthine a few grams of the hydrochloride were sent to Dr. Cushny for experiments upon animals. Here is a preliminary report which Dr. Cushny kindly sent me :

"Calycanthine hydrochloride was injected into the anterior lymph sac of a number of frogs of about 35 Gm. in weight. Smaller doses than 5 Mgs. had no definite effect ; 5 Mgs. caused some clumsiness in movement without further change at first, but after 12 to 24 hours there was generally a very slight increase in the reflex irritability. The impairment of movement proved to be due to partial paralysis of the terminations of the motor nerve ends. 10 Mgs. induced more marked depression of the nerve ends, and after some hours this was accompanied by great increase in reflex irritability, the spinal cord appearing to be in the same condition as in strychnine poisoning, though the spasms were shorter, owing to the imperfect conduction of the impulses through the nerve ends. 15 Mgs. induced the same symptoms, but generally proved fatal to frogs of this size after one or two days.

"The drug was injected into mammals—cats and rabbits—hypodermically. 5 Mgs. per Kg. had no distinct effects ; 20 Mgs. per Kg. induced, after 30 to 40 minutes, violent tetanic spasms resembling those following strychnine.

"In several experiments the effect on the circulation was examined by means of the mercury manometer, when it was found that the intravenous injection of 5 to 10 Mgs. per Kg. was followed by a marked fall in blood-pressure, with a very slow pulse and large oscillations. Atropine injection had no effect on these phenomena, so that they must be ascribed to direct action on the heart. Similar changes in the heart-beat were found to follow the injection of calycanthine in the frog and turtle.

"In mammals, calycanthine seems to act as a stimulant to the spinal cord and as a depressant to the heart. In frogs it has, in addition, a weak, curare-like action on the terminations of the motor nerves. The symp-

toms are so similar to those described in cattle from poisoning with calycanthus that there can be no doubt that the alkaloid is the chief poisonous constituent."

Northwestern University School of Pharmacy.

Mr. Eccles stated that he had made the alkaloid of calycanthine many years ago, and obtained anhydrous crystals of diamond-like beauty, the index of refraction of which had been determined by the Crystallographer of the Government at Washington.

Mr. Gordin could not quite agree with Mr. Eccles as to the brilliancy of the crystals, though they were pretty. He said he had not completed his investigations, and if time permitted he would carry his work further, and perhaps be able to report the results later.

The Chair said the paper of Mr. Gordin would take the usual course, without objection, and called for a paper by Messrs. H. W. Emmerson and L. E. Sayre, of Kansas, on "The Peroxides." Mr. Sayre explained that the joint-author of the paper, Mr. Emmerson, was not present, and the paper itself was not in complete form at this time, and he would hardly be justified in reading it except by title. This statement precipitated a discussion between Messrs. Ebert, Caspari (Jr.) and Sayre, as to the proper course to take with the paper under the circumstances, at the end of which Mr. Sayre was allowed to withdraw his paper.

Mr. M. I. Wilbert was invited to present his paper on "Epsom Salt." Mr. Wilbert explained before presenting his paper that it was not wholly a scientific one, but was written more to awaken interest in a subject that has been neglected. He then proceeded to abstract his paper, and presented an object-lesson in the filtration of impurities from this salt, as illustrated in some liquid samples he exhibited. The following is the text of the paper:

EPSOM SALT.

M. I. WILBERT.

While it would probably be difficult to present anything new or original in connection with such a well known and extensively used chemical as magnesium sulphate, there are, nevertheless, a number of facts of more or less general importance that may be interesting or new to some of the members of this Section.

Magnesium sulphate, as it occurs in the shops, is, chemically at least, a comparatively pure substance. In a general way it may be said to be available in three qualities, commercial, purified and chemically pure.

The chemically pure salt is only used as a reagent, and is seldom or never found in the shop of the apothecary. It should be free from even traces of hydrochloric acid and nearly free from any indication of sodium by the flame test.

The purified salt occurs in small colorless rhombic prisms, or acicular crystals, quite free from arsenic or any of the soluble salts of the heavy metals, but usually containing appreciable quantities of a sodium salt and of a chloride.

The commercial salt is seldom or never colorless, usually contains larger quantities of a chloride, probably as magnesium chloride, and a considerable amount of finely-divided insoluble material, generally consisting almost entirely of oxide of iron.

In addition to this, both the purified as well as the commercial salt are almost invariably contaminated by the more or less accidental admixture of foreign substances.

This admixture of foreign materials is the one objectionable feature that appears to be common to all so-called heavy chemicals. The contaminations may consist of pieces of wood, paper, nails, string, straw and a hundred and one other articles that have a faculty of finding their way into the barrels or containers of these various chemicals, and are usually accepted as a matter of course. Of the fifteen or twenty samples of magnesium sulphate that were purchased in retail pharmacies, not a single one was entirely free from this objectionable feature, the unnecessary admixture of foreign materials. In addition to this, as may be seen from the accompanying samples, several of the specimens were of a decidedly inferior quality, being comparatively dark in color and quite moist. This accompanying moisture is usually attributed to the hygroscopic character of the contained magnesium chloride.

There can be no reasonable excuse for offering an inferior quality of Epsom Salt for medicinal use, as the difference in the price, at first hand, is usually not more than a fraction of a cent. In this connection it may be said that the physical characteristics of magnesium sulphate, particularly in larger quantities, are frequently sufficient to condemn the poorer quality without the additional use of chemical reagents.

Of the chemical reagents, besides litmus paper and the necessary tests for identity, the solutions of silver nitrate and potassium ferrocyanide are probably of greatest importance. The first will indicate the approximate amount of the contained chloride, while the latter is valuable as indicating the presence or absence of iron, copper or zinc, and for all practical purposes is sufficiently delicate. Special attention should be directed to the contamination by finely-divided oxides, particularly oxide of iron. This latter is sometimes even found in salts that appear to be otherwise quite acceptable. It is most readily detected by making a saturated solution of the suspected salt with distilled water, and allowing to stand for from twelve to twenty-four hours. If oxide of iron is present it will occur as a finely-divided, brownish precipitate. On separating the precipitate and dissolving in dilute acids, it will be found to respond readily to the usual tests for iron.

This contamination is probably due to the fact that after roasting, to oxidize the iron salts, sufficient care has not been exercised to separate the resulting oxides in subsequent processes.

Magnesium sulphate is undoubtedly one of the most widely known and most extensively used medicinal chemicals. It is official in every known Pharmacopœia, although the official titles vary considerably. According to the Universal Pharmacopœe, by Dr. Hirsch, it is called *Magnesii Sulphas* in the United States and Great Britain, *Magnesium Sulphuricum* in Germany, *Sulfas Magnesticus* in Holland and Sweden, and *Sulfas Magnesiae* in Belgium.

Among the Latin and English synonyms that have been applied to it we may cite: *Magnesia vitriolata*, *sal amarum*, *sal anglicum*, *sal catharticum*, *sal Ebschamense*, *sal Ebsomiense*, *sal Seidlicense*, *sal Seidlitzense*, *sal Seidschützense*, *magnesium sulphate*, *bitter salt*, *bitter laxative salt*, *bitter purging salt*, *cathartic salt*, *English salts*, *Epsom salt*, *physical salt*, *laxative salt*, *sulphate of magnesia* and *vitriolated magnesia*.

The discovery of magnesium sulphate is usually accredited to Dr. Nehemiah Grew, an English physician and a son of the Rev. Obadiah Grew, a celebrated Nonconformist divine (1607-1698).

Dr. Nehemiah Grew was born in Coventry, England, about 1641. He received his classical education at Pembroke Hall, Cambridge. He was then sent abroad to study medicine, and received his degree of Doctor in Medicine at Leyden in 1671. On his return to England he devoted considerable time to the study of natural history, particularly botany; he was elected a fellow of the Royal Society in 1672, and one of the secretaries in 1677. Dr. Grew is particularly well known as a botanist, being noted for his studies and investigations on the anatomy and physiology of plants. In consideration of his professional and scientific work, he was made an honorary fellow of the Royal Society of Physicians in 1680.

The date of the discovery of Epsom Salt is variously given as 1675 and 1694. From the fact that the first edition of his pamphlet "A treatise of the nature and use of the bitter purging salt," appeared in London in 1697, the latter (1694) is probably the year in which magnesium sulphate was first made, by evaporating the waters of a spring at Epsom, in Surrey, England. Dr. Grew died in London, March 25, 1712.

About 1710, magnesium sulphate was found to exist in considerable quantities in the residual mother liquor or bittern of salt works. This bittern, for many years, was the chief source of the chemical in England, and later also in this country.

About 1815, Dr. William Henry, of Manchester, devised a process for manufacturing sulphate of magnesia and other magnesia salts from dolomite, a double carbonate of magnesium and calcium. This dolomite process is said to be still in use in England, despite the fact that giobertite, a native magnesium carbonate, has displaced it in many places.

In our own country magnesium sulphate was, according to the "History of American Manufactures," by Leander Bishop, first made by the evaporation of the waters of a spring located at Bridport, Addison County, Vermont, by the Rev. Sylvanus Chapin.

About the beginning of the nineteenth century, large quantities of magnesium sulphate were obtained as a by-product in the manufacture of salt from sea water, in Barnstable County, Massachusetts. The methods that were employed at that time, were described at some length by Daniel B. Smith, in the first number of the "Journal of the Philadelphia College of Pharmacy," published in 1825.

About 1828 or shortly after, a firm in or near the city of Baltimore began the manufacture of magnesium sulphate from native magnesite, a hydrated silicate of magnesia. The processes employed in this industry were described in 1833 by Elias Durand, in a paper published in the Journal of the Philadelphia College of Pharmacy (vol. 5, page 1).

The Maryland works were in a position to produce a salt equal in every respect to any that had been brought from England, and far superior to that produced at the salt works in Massachusetts; consequently they soon controlled the whole American market.

In the western country, as the region west of the Allegheny Mountains was then called, some magnesium sulphate was made at quite an early date, from the native salt occurring in the caves and caverns along the Ohio River. In one of these caves, "near the Big Blue River, in the Indiana country," the salt was said to form a stratum several inches thick on the bottom or floor of the cavern. At the present time probably the greater amount of the magnesium sulphate made in this country is made from native magnesium carbonate, giobertite, or as it is more frequently, but erroneously called, magnesite.

This mineral is being imported, largely from Greece, in considerable quantities, and is extensively used as the source of carbon dioxide for aerating artificial mineral waters.

Giobertite, or magnesia marble, occurs in compact, flint-like masses resembling a fine quality of white marble. It consists almost entirely of magnesium carbonate being contaminated with but traces of iron, calcium, aluminum and silica.

In the manufacture of carbon dioxide the large masses are usually subjected to a preliminary roasting which disintegrates the hard masses of rock. The smaller fragments are then either calcined in a special furnace to an oxide, or are treated in a suitable vat with sulphuric acid, the liberated carbon dioxide of either process, if intended for the so-called liquefied carbon dioxide gas, is washed and subsequently compressed.

The total importations of crude and roasted magnesite during the last six years have increased from approximately 8,000 metric tons in 1898 to 54,000 metric tons in 1903. The importations for the intervening years

being 20,000 tons in 1899, 29,000 tons in 1900, 32,000 tons in 1901, and 39,000 tons in 1902.

Magnesium sulphate itself has been imported into this country in rather varying quantities, being approximately 45 metric tons in 1898, 37 tons in 1899, 188 tons in 1900, 133 tons in 1901, 89 tons in 1902, and 1,219 tons in 1903. The sudden increase during the last fiscal year is said to be due to the fact that owing to the very low price for magnesium sulphate in the wholesale market, several American manufacturers have discontinued making it. Magnesium sulphate, in addition to its use in medicine, and as a source of other magnesium salts, is also used, quite extensively, in the arts and manufactures.

The sulphate is used in dyeing, as a fixing agent for a number of coal-tar dyes; in bleaching, as an addition to chlorine and peroxide compounds, particularly in the bleaching of animal fibres, where strong alkalies are contraindicated; in the textile industry, as an addition to the dressing in cotton and linen fabrics; in paper-making, to give a hard and glossy surface finish; in the beet-sugar industry, to aid in clarifying the syrup; and on a smaller scale, it is frequently used as an addition to whitewash where a brilliant and lasting white is desired.

The paper was received and referred.

Mr. E. H. Gane, at the request of the Chair, presented in abstract two papers upon cod-liver oil, one by J. P. Remington, Jr., and the other by himself. The papers were as follows:

COD-LIVER OIL.

(The Fresh Natural Product.)

BY J. PERCY REMINGTON.

There are few remedies among all the vast number of medicinal agents used to-day whose value has been so conclusively demonstrated as that of cod-liver oil. Although the medical profession has unfortunately lacked that uniformity of opinion on many therapeutic questions which is so desirable, it is, however, unanimous in its belief in the value of cod-liver oil as an alterative nutrient in wasting diseases and in cases of impaired digestion.

Many theories have been advanced to explain why cod-liver oil differs so materially in its physiological effects from other nutritious fats, the most popular one in the past having been that its nutritious activity is due to some active principle or alkaloid which might be extracted in much the same manner as the alkaloids are obtained from the various drugs. The different biliary products which have long been known to be present, such as phosphorus, bromine, iodine and gaduine, have in turn been picked out as the chief cause of its therapeutic effect, and many preparations containing these "tasteless principles" have been manufactured either as ex-

tracts or in the form of emulsions with various adjuvants added to conceal the taste of the oil.

Conservative medical opinion has, however, maintained ever since cod-liver oil was first used on the continent, that the virtue resides in the oil itself, and the biliary products simply assist in its preservation.

It therefore seems certain that whatever the facts in the case may be, a pure cod-liver unaltered in any way and collected with due care and properly preserved, must contain all the elements which play any part in its physiological effect, and hence the natural product cannot be improved upon.

The chief objection to its use in the pure state has been its unpleasant taste and nauseating effects which are quite pronounced in the ordinary oil of the market, and this has earned for it the reputation of being a very disagreeable dose to all but infants. These properties are, however, only slightly present in the oil as it is taken from the fresh livers, but they are quickly developed by the process of absorption and rancidity which may be largely prevented by cleanliness in collecting the oil and care in preserving it, so that the cod-liver oil may be bottled in this country and still possess the bland taste that it has on fishing banks where it is drunk as a food by the fishermen.

It is hoped that the facts given in this paper may encourage those who consider therapeutic efficiency as of first importance in using remedial agents to adhere to the natural in preference to the manufactured article, taking pains to insure palatability by care in selecting the oil.

It is therefore not a matter of indifference as to the source, collection and method of keeping cod-liver oil, and it may be interesting to know how the pure fresh oil is obtained.

Several varieties of the cod fish are used as a source of the various brands of oil, chief among which are the common cod, haddock and pollock, but the oil found in the livers of each variety seems to be very similar—the chief variations in the product being due to its source and preparation for the market. Norwegian oil is very superior to that from New Foundland or other fishing banks as the intensely cold weather in this northern region prevents the decomposition of the animal matter in the oil and permits of it being pressed out when the oil is at a very low temperature.

The cod-liver oil obtained from Norway ranges from an almost colorless to a deep brown oil, and although these various grades may have the same medicinal effect, the taste is decidedly different, the white oil having a pleasant, bland taste, while the dark oil has a fishy taste that is nauseating to most people. The light-colored oil is what is known as the shore oil, and is obtained from the livers of fresh fish, which the small boats catch near the shore and bring in the same day. The livers are then cut out, put into a vat, frozen, and the oil subsequently pressed out. The darker

oil is known as banks oil, and is collected by the larger boats which remain out for several days until a complete load is obtained, the livers being placed in barrels on board the vessels where they are allowed to decompose, and in the meantime the oil which comes to the surface is drawn off and purified.

This dark oil is used extensively for commercial purposes, chiefly in oiling sole leather, to which it gives the well-known peculiar odor.

Some of the best cod-liver oil comes from Bergen, Norway, and is what is known as cold-pressed shore oil. It should be imported only during the winter months in air-tight drums and bottled after clarification by settling, avoiding contact with air and light as much as possible, and as a further precaution against rancidity it should be well corked and kept in a cold cellar until ready for shipment. It is of a clear light yellow color with very little odor or taste and will be found to be easily taken and retained except by those to whom the physical characteristics of oil itself are objectionable. For administration to such patients it may be mixed with soda water, lemon juice or any vehicle that may be suggested by the physician, but it is undoubtedly most efficient when used in its natural state as its effects are usually impaired by the efforts to cater to the palate of the patient.

In using cod-liver oil care should be exercised to see that any oil remaining on the lip or around the cork after using a bottle should be carefully wiped off, as the best oil may be spoiled by rancidity developed in this way.

Last year's failure of the Norwegian fisheries and the consequent high ruling prices, developed the most extensive adulteration and substitution—seal and menhaden oils and less often mineral and lard oils being widely used. The prospect of another year of curtailed production, which at the present writing is estimated at only 15 per cent. of the average yield, makes it a necessity for the pharmacist to employ the simple tests given in the Pharmacopœia for the detection of adulteration and to obtain his supply from direct importers.

August 17th, 1904.

TESTS FOR THE PURITY OF COD-LIVER OIL.

BY E. H. GANE, PH. C., NEW YORK CITY.

In a paper presented at the Mackinac meeting the author gave the results of an examination of a number of samples of cod-liver oil and drew attention to the various tests recommended as criteria of purity. From the results therein given and from the results of similar recent investigations by other analysts it is evident that the accurate determination of the purity of an oil is not always an easy matter. The experience of the past season with its extreme scarcity of the finer grade of oil has however shown the value of the tests especially emphasized in the paper referred to, and

the present paper is contributed with the especial object of showing the retail pharmacist, who has not the time nor experience necessary to perform the more elaborate tests, that he has at his disposal simple means of determining the purity of this important product. The three tests given in the above-mentioned paper coupled with a determination of the amount of free fatty acid will readily enable the pharmacist to detect any of the common adulterants and substitutes.

Continued experience has served especially to show the value of the nitric acid test. The beautiful rose-pink color rapidly changing to a lemon-yellow which persists for many hours is exceedingly characteristic and is not given by any of the substitutes or adulterants. The use of nitrosulphuric acid in this test which has been recommended by some analysts does not give such accurate results as the end reaction (*i. e.*, the change to lemon-yellow) is entirely obscured, the mixture of oil and acid assuming a brownish color and leading to inaccurate deductions. Performed with care and avoiding excess of acid the nitric acid test is one of the most valuable at our service at the present time. Two drops of acid to fifteen drops of oil is recommended as the most satisfactory proportion for general use. This test alone will detect admixture with most of the usual adulterants. It is particularly serviceable in detecting admixture with vegetable oils, lard oil and other fish oils.

The determination of the percentage of free fatty acid is important from a medicinal as well as analytical standpoint, and is a test which can be very easily performed. An oil containing a high percentage of free acid is much more liable to cause eructations when administered internally, and for this reason it would be well if the new Pharmacopœia would set a limit upon the amount of free acid allowed in cod-liver oil. Special attention has been given in this test in examining cod-liver oil for adulterants as it is one of the most valuable indications of admixture with other fish oils. The test is performed as follows :

Weigh carefully 25 to 50 grammes of oil into a six or eight ounce flask, and add 100 Cc. of alcohol carefully neutralized. Shake well and raise to the boiling-point by means of a water bath. Then add a few drops of phenolphthalein, and run in very cautiously a semi-normal solution of soda or potassa from a burette or accurately graduated pipette until the liquid assumes a permanent pink tint. Note the number of Cc. of caustic alkali used, and multiply this by 0.141, which will give the amount of free fatty acid present in the given weight of oil, calculated as oleic acid. The percentage can then readily be determined.

Below are given the percentages of free acid found in a number of samples examined during the past season. The finest grades of Norwegian and New Foundland oil contain about 1 per cent. or less of free acid, but occasionally, samples of adulterated oil are found which run as low as this. The constants of these oils fell within the published limits for a pure oil,

but some of them presented certain abnormal points which tended to cast suspicion upon their genuineness.

No. of Sample.	Origin.	Percentage of free acid calculated as oleic acid.
1.	New Foundland,	0.55
2.	"	0.691
3.	Hammerfest,	1.62
4.	"	1.60
5.	Norway,	2.87
6.	"	1.22
7.	"	0.68
8.	"	0.516
9.	"	1.20
10.	"	1.19
11.	New Foundland,	4.52
12.	"	3.15
13.	"	3.01
14.	"	0.825
15.	"	0.576
16.	"	0.06
17.	Sea oil,	0.75
18.	Norway,	1.35

Samples 1, 2 and 16 answered all the tests except the freezing test, and were offered as freezable oils. Presumably the manufacturer was without adequate facilities for rendering his oil "non-freezable." Samples 3 and 4 were offered as genuine Hammerfest oil, but bore every ear-mark of having been mixed with a large percentage of "coast oil." The high percentage of fatty acid and their behaviour with nitric acid and upon saponification, all tended to prove this. Sample 5 stood the various tests well, except that the nitric acid test and the high acidity points to the presence of other fish oils. Samples 6, 7, 8, 9 and 10 were genuine Norwegian oils, the high acidity of Nos. 6, 9 and 10 being doubtless due to age. Samples 11, 12 and 13, while offered as pure New Foundland, were the ordinary "coast," or "shore oil." Samples 14 and 15 were genuine high-grade New Foundland oils. Sample 17 was a water-white seal oil, and sample 18 evidently a mixture from its behaviour upon saponification and with nitric acid.

The refractive index has been suggested as a useful aid in recognizing admixtures of cod-liver oil with other oils, but in the writer's hands this figure has not proved of much service. The indices of the above-mentioned samples as determined with the oleo-refractometer, using sodium light, are as follows :

No. of Sample.	Ref. Index 25° C.	No. of Sample.	Ref. Index 25° C.
1.	1.4828	10.	1.4765
2.	1.4795	11.	1.4788
3.	1.4775	12.	1.4776
4.	1.4765	13.	1.4775
5.	1.4760	14.	1.4765
6.	1.4795	15.	1.4765
7.	1.4785	16.	1.4770
8.	1.4794	17.	1.4768
9.	1.4779	18.	1.4765

New York, August 31, 1904.

Mr. Hynson and Mr. Dohme told of some of their experiences with cod-liver oil, and Mr. Kebler spoke of the work being done in the laboratory of the Bureau of Chemistry at Washington. He said they had great difficulty at first in getting a pure article, but now they were getting a pure cod-liver oil through the Fish Commission, which was glad to extend any assistance because of interest in the home industry. He said they had even offered to send a man to Norway to investigate the manufacture there, in order to determine whether they had anything to do with the supposed superiority of Norwegian oil.

The papers were ordered to take the usual course.

Mr. W. O. Richtmann, at request of the Chair, then presented in abstract the following paper on the curing of leaf drugs, by Messrs. True and Stockberger :

THE CURING OF LEAF DRUGS WITH ESPECIAL REFERENCE TO THEIR APPEARANCE.

BY R. H. TRUE AND W. W. STOCKBERGER.

At the present time it is certain that many more crude drugs are bought and sold on their appearance than on their tested physiological properties. It is, therefore, important for any grower or collector of crude drugs that he should strive to obtain sightly articles. In this discussion especial attention is given to leaf drugs since it is more difficult to obtain the desired appearance in leaves than in other types of crude drugs of vegetable origin.

The appearance of a crude leaf drug is dependant on (1) the wholeness of the leaf, and (2) on the color. The degree to which the leaf may be broken is largely dependant on the amount of moisture present. Stramonium leaf, and many other kinds, when containing less than 5 per cent. of water are apt to be brittle. If too dry, care in handling will do but little to preserve the leaf in an unbroken condition.

The color of the leaf is in general dependant on the green coloring matter known as chlorophyll. Chlorophyll is found in the superficial parts of plants impregnating minute colorless granules. Experiments have

shown that light, while necessary in general for the formation of this green pigment, when present in too great intensity breaks it down, the result being a substance having a yellowish-green color. Chlorophyll is also decomposed by the action of acids even in considerable dilution with the result that a somewhat similar yellowish-green color is developed.

In addition to the chlorophyll bodies the cells of fresh leaves contain a large number of chemical compounds of whose nature very little is known. Many of them are in all probability extremely unstable and out of reach of the present methods of chemistry. Since the juice of fresh-crushed leaves is markedly acid, we know that a considerable amount of one or more acids is present. In all probability many active principles exist in these cells in a dissolved state. From the evidence now at hand it appears likely that many substances capable of reacting when brought together under proper conditions exist in a dissolved state in the cell at the same time without any such reactions taking place. Indeed, some investigators have asserted that a single living cell may contain at one time both an acid and an alkali so isolated as to prevent their coming into contact with each other. This isolation is brought about by the enclosing of the dissolved substances in separate vacuoles surrounded by their membranes of protoplasm. According to this explanation the substances are kept apart by special membranes of living material. It has been shown for tannins and several other principles that such a method of isolation is maintained.

It is also probable that enzymes of different kinds, located at such points as the activities of the plant may determine, are found in the cells of fresh leaves. Among these enzymes those carrying out oxidizing processes are of significance in connection with the preservation of the bright color of leaf drugs. Those enzymes known as oxidases are able to use the oxygen of the air in bringing about the oxidation of tannins and other compounds with the development of brown products.

It is clear from these considerations that there are stored in the living cell various substances capable when mingled, of producing bodies which have an unfavorable effect upon the green color of the leaf drug. The presence of moisture in sufficient quantities to readily support chemical reactions is necessary to all of these changes.

The most conspicuous modification that marks the drying-out of a leaf is the loss of water and the consequent shrinkage in bulk. A leaf may lose water up to a certain point and yet the cells constituting it may not be killed. When, however, the water loss goes beyond this point the structure of the most unstable substance the living protoplasm, seems in some way to be injured, and the protoplasm, like the copper sulphate crystal from which the water of crystallization has been removed, falls to pieces. This means the destruction of the protoplasmic layers surrounding the vacuoles in which the isolated compounds are held, and the consequent permeabil-

ity of these retaining membranes. Should the enclosed substances now diffuse together they will react according to the degree of mixture. The only practicable way to check these reactions is to continue the drying process until there is not enough moisture left to support them. Thus further drying would tend to limit the undesirable changes initiated by the previous stages of desiccation.

Two classes of reactions are likely to result in detriment to the appearance of the drug: (1) the acid solutions of the cell by acting on the chlorophyll, tend to give the product a yellowish color; (2) the oxidizing enzymes acting on the tannins and other oxidizable compounds present, give the product a brownish color. When, in curing a leaf drug, it fails to lose water steadily, especially during the earlier stages, enough moisture is retained to support not only the action of the acids on the chlorophyll, but, more important still, the action of the oxidases on the oxidizable substances present, the development of a more or less marked brown color ensuing. Hence, the necessity of maintaining a steady loss of water from the leaf, especially in the earlier stages of curing.

In curing drugs by artificial heat, if the temperature to which the fresh leaf is exposed exceeds about 50° C., a cooked appearance results, accompanied by a darkening of the leaf. This may be explained, at least in part, by what has already been indicated. The protoplasm is killed by the action of the heat rather than by the loss of water, and the reacting compounds are freed from their isolating vacuoles in the presence of an abundance of moisture. Consequently, chemical reactions take place with great freedom, resulting in the relatively complete action of the acids with the chlorophyll, and in the more prolonged action of the oxidases on the contents of the cells, both of which processes injure the color of the drug.

The following practical rules for the curing of leaf drugs may here follow by way of summary: Cure leaf drugs in such a way that the water loss is steadily maintained during the process. Dry until a degree of desiccation is reached which shall inhibit chemical reactions.

If artificial heat is used, be careful not to heat the fresh leaf to such a degree as to thereby injure the protoplasm, since the death of the cells should be brought about only through water loss.

After the protoplasm has been killed, carry on desiccation more rapidly until chemical reactions are inhibited. Should the leaf be collected for its volatile oils, keep the temperature low, but do not fail to secure a steady water loss.

Since strong sunlight changes chlorophyll to a greenish-yellow substance, avoid too long exposure to sunlight.

After some remarks by Messrs. Kremers, Eccles and Richtmann, the paper was referred for publication.

The report of the Committee on Chairman's Address was called for, and Chairman Koch read the following :

REPORT OF COMMITTEE ON CHAIRMAN'S ADDRESS.

The Committee to which has been referred the Chairman's Address and the Report of the Committee on Scientific Papers, respectfully submits the following report :

We desire to thank the Chairman for the trouble he has taken to prepare a resumé of the progress made in analytical chemistry during the past year. While we commend the sentiment that prompted him not to read a long technical report, we desire to express the hope that he will continue the good work he has begun by presenting similar reports each year.

The thanks of this Section are due its officers for the printed program, which not only states the order of business, but also gives abstracts of the papers presented.

The features of this program are so excellent that its preparation should be made obligatory on future committees, and your Committee would, therefore, recommend that Chapter IX., Article IV., of the By-Laws be amended to read as follows :

"Any person desiring to submit a paper to the Association shall present to the Chairman of the particular Section to which it refers, at least ten days prior to the meeting, an abstract of said paper indicative of its contents, and consisting of not less than fifty nor more than two hundred words. This abstract shall be printed as a part of the program. The paper itself must be submitted to the officers of the Section previous to the first session. Not more than ten minutes shall be allowed for the presentation of any paper unless by unanimous consent of the Section."

We heartily endorse the suggestion that, whenever feasible, the officers of this Section secure an address of a sufficiently broad and non-technical character pertaining to scientific pharmacy that will be of interest to the members of the Association generally.

Respectfully submitted,

J. A. KOCH, *Chairman*,
GEO. M. BERINGER,
E. KREMERs.

On motion of Mr. Caspari, the report was accepted.

Mr. Kebler presented in verbal abstract the four papers that here follow, explaining that on account of lack of blackboard facilities he could not give some illustrations he desired. In connection with his paper on the assay of opium, he exhibited some large charts showing variations in the assay of this drug by different chemists, taking the same samples and using the same methods.

CHEMICAL REAGENTS.

BY LYMAN F. KEBLER.

Before connecting himself with the Bureau of Chemistry, it was the writer's privilege to be associated with one of the largest manufacturing and analytical laboratories in Philadelphia, where were manufactured not only the medicinal remedies derived from plant and animal sources but also many chemicals used in medicine and for analytical purposes. Before entering into the manufacture of any chemical it was customary to secure various brands of the chemical under consideration, on the open market, and determine their quality so as to be informed regarding the purity of

the chemical necessary to supply in order to meet competition. When it is called to mind that the writer in this way started and continued to manufacture no less than 300 different chemicals and assisted in making about 1500 analyses per year, it can readily be seen that an excellent opportunity was afforded to become acquainted with many brands of chemicals and the manner of labeling them. The misrepresentation of the quality of the chemicals made a profound impression. The writer, in common with most college graduates, labored under the delusion that the quality of a chemical was indicated by the label on the package. The finding of gross impurities in C. P. chemicals was simply astounding. Literature was searched and here and there a reference was found that now and then chemicals of inferior quality were discovered. The excellent books of Curtman and Krauch pointed to the signs of the times, but nothing had apparently been printed that coincided with the writer's experience. The situation was followed up for a number of years and it was concluded that these misrepresentations and the delivery of inferior goods was not ephemeral but had come to stay, unless chemists would make a combined effort to eradicate the evil. Competition is impossible because the bidder who bases his quotations on the lowest grade of goods, nine times out of ten gets the contract.

In 1901, the writer presented short communications to the chemical section of the Franklin Institute of Philadelphia and the Pennsylvania State Pharmaceutical Association, calling attention to the existing conditions, with numerous examples and suggested that chemists co-operate and bring order out of chaos. At the 1902 winter meeting of the American Chemical Society the subject was discussed and a special committee was appointed to investigate the subject of chemical reagents. Thus far the committee has made little substantial progress.

The unsatisfactory condition of chemical reagents was one of the subjects considered at the Congress of Applied Chemistry held at Berlin, Germany, June, 1903, and a special Committee on the Testing of Chemical Reagents was appointed at the annual meeting of the Association of Official Agricultural Chemists held in Washington, D. C., November, 1903.

At first sight it seems a small matter to set fair and proper standards for chemicals, but an investigation shows that it is a large undertaking, and means a number of years of hard work.

When we consider the improvements, both chemically and electro-chemically, during the past decade, whereby products of a high degree of purity at a decreased cost are produced, it is but reasonable to expect that instead of our chemicals becoming inferior, they should show a marked improvement. It is probably advisable to use the word inferior with some reserve, because we have little definite knowledge as to the quality of chemical reagents used in former days. Chemists of olden times undoubtedly prepared or purified most of their chemical reagents, and the

quality of commercial chemicals was little considered, being usually pure enough for use in the arts.

Some chemists are of the opinion that manufacturers and dealers ought to supply them with the proper grade of chemicals called for without being compelled to test them. If chemists will first of all put themselves on record to the effect that they will not accept any delivery except it is of the quality ordered, a great step in advance will be made. Let chemists join hands in this matter, work together for the common good, and the trouble will soon be eradicated. If dealers once know that chemists are demanding the quality of chemicals called for, they will present another front. A spirit of indifference on the part of chemists, a trusting to the integrity of the dealers, and the plea of want of time to examine reagents will bring about a changed condition only with the coming of the millenium.

With few exceptions manufacturers of chemicals and jobbers are compelled to compete with one another in their line of business, and competition is frequently on the price basis, irrespective of the quality. The natural result is that if cheap and inferior products are placed on the market by one firm, the same conditions must be met by another competitor or lose the trade. For example, some years ago the writer received an order for c. p. zinc sulphate. The article was delivered, and a price corresponding to the quality of the article was charged. The recipient of the goods indignantly replied that he had been getting a chemically pure article for a much lower price, and asked why we could not supply a similar article for the same price. The complainant was asked to submit a sample of the goods he had formerly received as of c. p. quality, and on investigation it was found that the article was one of commercial grade. He was therefore informed that if he wished c. p. zinc sulphate of a quality similar to the sample submitted, we would be glad to furnish it at his price, or even less, in small or large quantities, as he desired. Nothing further was heard from this consumer.

Again, if one competitor marks a given article "c. p.," those in the same line of business must act in a similar manner. If a customer orders his chemicals under the designation "c. p." they must be so marked and the price must be the same as that of other dealers or there will be friction. What are the results? The designation "c. p." has come to have no significance whatever, and if it has any meaning, such meaning is interpreted to suit the convenience of the dealer. Several years ago a sample of potassium iodide was examined and found not to be of the quality ordered. The manufacturer was informed concerning the shortcomings of the chemical. He immediately responded in person and appeared very indignant because we had rejected the article. He was informed that his package was marked "c. p.," and he unblushingly responded, saying "that the 'c. p.' in this case had no reference whatever to the usual meaning, 'chemically pure,' but simply meant *commercially pure*." Some tell us

that the designation "c. p." means *conveniently pure* chemicals, of which quality there are many.

Whatever may be the exact status of the designation "c. p." in the average mind, it is quite apparent that the best manufacturers abroad recognize the worthlessness of this term as used in the chemical world at present, and have accordingly dropped it from their price-lists to a large extent. It is very interesting to note that our American manufacturers and jobbers however, seem to cling tenaciously to this well-known term, but their products do not appear to be any better than those delivered by foreign manufacturers. To show that this designation is used quite loosely and with a meaning very different for each line of business, a number of examples will be cited. An ironmaster ordered "c. p." zinc chloride and sodium bisulphide, both very difficult of preparation. Undoubtedly chemicals of good quality were desired; such were shipped, and the recipient did not enter any complaint, although they were not marked "c. p." That no complaint was entered is quite unusual, because men usually like to receive the goods they order to be marked according to the instructions sent to the manufacturer or jobber. Manufacturers of strong inorganic acids and high-grade glycerin usually mark their best goods "c. p.," not because they believe them to be of "c. p." quality, for they know such is not the case, but because such a custom has grown up and consumers seem to demand it. Brokers and jobbers are much more inclined to the labeling of their chemicals in such a manner as to make the average chemist think they are dealing in chemicals of a superior grade. As a matter of fact, however, the labels are frequently put on the packages to suit the convenience of dealers.

The writer does not believe in setting a standard which will require a purity of 100 per cent., neither does he believe that it is practicable to require a chemical to be absolutely free from all insoluble matter, where the chemical is soluble in water. It is seldom possible to make a chemical absolutely free from all foreign matter, but it is possible to make chemicals of such a character as to be free from all agents which will interfere in ordinary chemical analysis. Manufacturers have manifested a desire to supply chemicals along these lines and in many cases have been marking chemicals in such a way as to indicate the absence of certain impurities. For example, potassium permanganate and magnesium oxide are frequently marked as being free from sulphur; sodium hydroxide free from nitrogen, copper sulphate free from iron. The writer's experience, however, with some of the chemicals supplied under labels of the above character is, that they do not comply with the representations placed on the package. Nothing more can be expected for the present than to have manufacturers state exactly what is contained in the package, and thus the chemist can readily determine for himself whether the chemical is or is not fit for his use, but a uniform standard would be far more satisfactory.

Drug Laboratory, Bureau of Chemistry, Washington, D. C.

A PRELIMINARY REPORT ON THE PRESENCE OF NITROGEN AND NITRATES IN MEDICINAL PLANTS.

BY LYMAN F. KEBLER, CHIEF OF DRUG LABORATORY, U. S. DEPARTMENT OF AGRICULTURE.

It has long been known that certain plants contain* large quantities of nitrates, the most conspicuous being members of the solanaceous family. Nitrates are considered among the most valuable nourishing agents of plant life, and it is believed by some to be the chief source of plant nitrogen. It seems to be a well-established fact that both higher and lower forms of plant life are able to construct proteids out of nitrates. We would therefore expect to find nitrates in almost all plant life, and certain workers appear to have found such to be the case.

While making some analyses of dry medicinal plants it was noticed that stramonium leaves contained large amounts of nitrogenous matter. It was also observed that some of the domestic leaves did not show the presence of nitrates with the delicate diphenylamine reagent, while all imported leaves showed the presence of nitrates with this reagent. Nitrates were also found in American-grown digitalis leaves, but not in imported samples. One sample of pilocarpus leaves contained nitrates, while the remaining sample did not contain such compounds.

If all plants in the fresh state contain nitrates it is quite probable that some are destroyed in the process of curing for the market, as has been shown in the case of tobacco. It is interesting to note the presence of nitrates in the single sample of pilocarpus leaves.

The large amount of nitrogen in stramonium leaves is interesting from an economic point of view. It is well-known that this plant frequently grows on the poorest kind of soil, and the source of its nitrogen may be of interest. This question is at present being studied.

Below will be found a table embodying the results so far as secured. In this table will also be found the per cent. of ash. It is quite evident that the amount of ash which in stramonium leaves of known purity varies from 9.26 to 22.72 per cent. can be of little service in determining the quality of this drug.

* Attfield, Pharm. Jour., 3, 447, 1862.

TABLE OF NITROGEN AND NITRATES IN SOME MEDICINAL PLANTS

Serial Number.	Source.	Kind of Plant.	Per cent. of Nitrogen.	Nitrates Present.	Per. cent. of Ash.
85.....	Imported.	Pilocarpus.	2.49	No.	5.15
96.....	"	"	2.17	"	9.75
114.....	"	"	2.36	Yes.	10.41
120.....	"	"	2.58	No.	5.22
86.....	"	Stramonium Leaves	5.80	Yes.	19.33
97.....	"	"	5.07	"	17.24
116.....	"	"	5.52	"	14.45
125.....	"	"	5.32	"	22.72
519.....	American.	"	4.51	No.	15.24
521.....	"	"	5.08	"	13.71
522.....	"	"	5.14	Yes.	14.08
523.....	"	"	5.35	"	9.26
524.....	"	"	5.36	"	16.95
525.....	"	"	4.69	"	15.38
526.....	"	"	3.99	"	13.18
528.....	"	"	4.87	"	15.52
529.....	"	"	5.11	"	14.75
531.....	"	"	3.60	No.	13.99
533.....	"	"	4.04	"	14.14
535.....	"	"	4.75	Yes.	15.28
536.....	"	"	4.69	"	14.00
537.....	"	"	5.08	No.	13.31
539.....	"	"	5.18	Yes.	15.36
540.....	"	"	4.54	"	15.04
541.....	"	"	5.55	"	13.50
542.....	"	"	5.21	"	12.86
543.....	"	"	4.27	"	14.98
545.....	"	"	5.98	"	14.66
546.....	"	"	4.79	"	14.92
547.....	"	"	4.91	"	14.11
518.....	"	Stramonium Seed.	2.77	No.	2.42
548.....	"	"	3.00	"	2.91
593.....	Imported.	Belladonna Leaves.	4.30	Yes.	13.70
104.....	"	"	4.23	"	15.35
122.....	"	"	4.06	"	....
108.....	"	"	3.85	"	16.57
527.....	"	"	2.16	"	6.24
530.....	"	"	1.03	No.	6.01
532.....	American.	"	5.42	"	14.40
520.....	"	Digitalis Leaves.	2.70	Yes.	11.13
534.....	"	"	2.83	"	15.61
538.....	"	"	2.75	"	18.51
544.....	"	"	2.72	"	25.31
92.....	Imported.	Nux Vomica.	1.46	No.	1.50
103.....	"	"	1.31	"	1.59
113.....	"	"	1.26	"	1.29
121.....	"	"	1.36	"	1.94
99.....	"	Coca Leaves.	2.57	"	12.46
115.....	"	"	2.80	"	10.04
128.....	"	"	2.97	"	12.46
148.....	"	"	3.26	"	9.24
110.....	"	Calabar Bean.	3.24	"	3.75
127.....	"	"	2.90	"	4.24
117.....	"	Ipecac Root.	1.56	"	3.03
129.....	"	"	1.78	"	1.73
368.....	"	"	1.78	"	....
369.....	"	"	1.78	"	....

CO-OPERATIVE WORK ON OPIUM ASSAYING.

LYMAN F. KEBLER, CHIEF OF DRUG LABORATORY, U. S. DEPARTMENT OF AGRICULTURE.

In his address as Chairman of the Scientific Section of the American Pharmaceutical Association, delivered at Philadelphia, 1902, the present chief of the Drug Laboratory recommended that, if possible, the Revision Committee of the Pharmacopœia continue the sub-committee on assaying during the interim between revisions, and instruct the committee to make yearly reports of its work to the Scientific Section and publish the results. In this way the large amount of necessary work could be extended over a considerable space of time instead of crowding it into less than two years. If, however, such a movement should not appear feasible, let a committee be appointed by this section, and take up the work. The committee appointed to report on the chairman's address approved of the recommendation, but could not put it in operation. No action was taken. The subject, however, took shape in entirely unexpected quarters, and the first results are presented to this section for suggestions and improvements:

At the Twentieth Annual Convention of the Association of Official Agricultural Chemists, 1903, a referee on medicinal plants and drugs was appointed. The immediate object of this appointment is a collaborative, systematic study of the analytical methods used in determining the quality of crude, plant drugs and products derived from them with a view to improving and ultimately unifying the methods of analysis for such substances. The earnest co-operation of every chemist interested in this line of work is most cordially invited. The referee will take pleasure in sending samples for analysis to all who inform him on or before April 11 of their willingness to co-operate in the work.

The work this year will be confined to powdered opium, and the methods to be studied at this time are those considered to be among the best. Suggestions for new methods or improvements on old processes will be gladly received and given an impartial trial next year, or at an earlier date if possible. The results should be in the referee's hands not later than August 15, 1904.

POWDERED OPIUM.

METHOD 1.—UNITED STATES PHARMACOPŒIA, 1890, WITH ADDITIONS.

Run two sets of duplicates on opium as received and report results for each set. Also weigh the crystals in the inner filter counterpoised by the outer filter, and report results. Intimately mix the morphine of each set and test them as follows:

- (1) Dry 0.5 gramme at 110° C. to constant weight, and note per cent. of loss.
- (2) To 0.5 gramme of morphine, dried at 60° C., add 18 Cc. of decinormal sulphuric acid, warm slightly to bring about a complete combination of the alkaloid and acid, and add 50 Cc. of distilled water and 5 drops of cochineal solution (prepared according to Sutton's Volumetric Analysis from pure cochineal). Then titrate back the excess of acid with $\frac{N}{40}$ potassium hydroxide solution. Each cubic centimeter of decinormal sulphuric acid solution represents 30.23 mgs. of crystallized morphine. Report per cent. of purity.
- (3) In a 100-Cc. glass-stoppered cylinder place exactly 0.5 gram. of crystallized morphine; add 25 Cc. of decinormal potassium hydroxide and shake thoroughly at intervals until the crystals are disintegrated. Dilute to 100 Cc. with neutral distilled water, mix thoroughly, filter, and to 50 Cc. of the filtrate add 25 Cc. of decinormal sulphuric acid and 5 drops of cochineal solution. Titrate back the excess of acid with $\frac{N}{40}$ potassium hydroxide solution. Each 50 Cc. of the above filtrate contains 0.25 gram. of morphine and 12.5 Cc.

of decinormal potassium hydroxide solution. The amount of acid in excess of that required to neutralize the alkali in the filtrate and the alkali added to titrate back the excess of acid is combined with the alkaloid. Each cubic centimeter of decinormal acid represents 30.23 mgs. of crystallized morphine. Report per cent. of purity.

Place 0.5 gram. of the morphine in a graduated glass-stoppered cylinder, carefully add, by pouring down the side of the inclined cylinder, 50 Cc. of good lime water; stopper the cylinder, and agitate its contents by cautiously tilting backward and forward, so as to avoid the formation of a froth on the surface. The agitation is to be continued until complete solution results or the particles cease to diminish in size. The solution is then filtered through a pair of counterpoised filters about 7 Cm. in diameter, the residue and filters being well washed with 5 Cc. of lime water, and then with 5 Cc. of water. When drained the filters are closed, pressed between bibulous paper, dried to constant weight at 100° C., and weighed. The difference in the weight of the two filter papers is the amount of foreign material, insoluble in lime water, which is associated with morphine. Report purity of morphine by this method.

METHOD II—LIME METHOD, UNITED STATES PHARMACOPEIA, 1880, AND BRITISH PHARMACOPEIA, 1898, MODIFIED.

In a 250-Cc. Florence flask or suitable bottle place 14 grams of opium and 6 grams of slaked lime. (Prepare the lime by mixing in a beaker, with constant stirring, 10 grams of good quality, powdered quicklime and 5 Cc. of water; when the reaction is completed set aside to cool.) Mix the lime and opium thoroughly, and gradually add 140 Cc. of water in small portions, and with frequent agitations. Stopper the flask, and shake occasionally with a rotary motion during two hours. Filter through a dry 10 Cm. plaited filter. Transfer exactly 104 Cc. (representing 10 grams of opium) of the filtrate to a 250 Cc. Florence flask or suitable bottle; add 10 Cc. of ethyl alcohol (about 95 per cent.) and 50 Cc. of ether (specific gravity, 0.725 at 15° C.). Shake the mixture, add 4 grams of ammonium chloride, shake vigorously for five minutes, then shake well at intervals during one-half hour, and set aside in a cool place for 12 hours for the morphine to separate. Counterpoise two 9-Cm. filters, placing one within the other on the funnel in such a way that the triple fold of the inner one is laid against the single fold of the outer; moisten them with ether and transfer the ethereal layer in the flask to the filter either by careful decantation or by means of a pipette. Add 10 Cc. of ether to the flask, rotate it carefully and allow it to stand a few minutes before decanting the ethereal layer onto the filter. Repeat this operation with 10 Cc. more of ether. Let the filter air dry and then pour into it the contents of the flask in portions, in such a way as to transfer the greater part of the crystals to the filter. When the liquor has passed through, transfer the remaining crystals to the filter by washing with several portions of water, saturated with powdered morphine, using not more than 20 Cc. of the morphinated water in all. Allow the double filter to drain, then apply morphinated water to the crystals, drop by drop, until they are practically free from mother-liquor; finally wash them, drop by drop, with alcohol previously saturated with powdered morphine until the washings are free from color. When the alcohol has passed through displace the adhering alcohol by ether, using about 10 Cc. or more if necessary. Allow the filter to dry to constant weight at a temperature not exceeding 60° C. Weigh the crystals in the inner filter counterpoised by the outer filter, then carefully transfer the crystals to a tared watch-glass and weigh again. Report both weighings.

Test the morphine for purity, etc., as directed under Method I and report results.

METHOD III—STEVENS.

Triturate 4 grains of opium in a mortar with 2 grams of fresh oxide of lime (not air-slaked) and 10 Cc. of water until a uniform mixture results. Add 19 Cc. of water and stir frequently for half an hour. Filter through a dry filter about 10 Cm. in diameter, and

transfer exactly 15 Cc. to a 60 Cc. bottle. To this add 4 Cc. of alcohol and 10 Cc. of ether, and shake the mixture; then add 0.5 gram of ammonium chloride. Shake well and frequently during half an hour, and set aside in a cool place for twelve hours.

Remove the stopper carefully and preserve, with any adhering crystals, for future use. Pour the ethereal layer into a small funnel, the neck of which has been previously closed with a piece of absorbent cotton. Rinse the bottle with 10 Cc. of ether, and when this has passed through pour the contents of the bottle into the funnel. Without trying to remove all of the crystals from the bottle, wash the bottle and the contents of the funnel with morphinated water until the washings are colorless. When the crystals have drained, place the stem of the funnel in the bottle containing adhering crystals, and with a small glass rod, drawn out to a curved point, lift the cotton and rinse the crystals into the bottle with 12 Cc. of decinormal sulphuric acid, using the cotton on the end of the rod to detach any adhering crystals. Place the cotton in the bottle, replace the cork, and agitate until the crystals are all dissolved. Rinse the cork and funnel with water, and titrate the excess of acid with $\frac{N}{40}$ potassium hydroxide.

The number of cubic centimeters of decinormal acid consumed by the morphine, multiplied by 1.5038, will give the percentage of morphine obtained, to which add 1.12 as a correction for the morphine remaining in the solution.

L. F. KEBLER,

Washington, D. C., March 30, 1904.

Referee, Medicinal Plants and Drugs.

The above instructions were sent to fifty different chemists and manufacturing houses. Ten favorable responses were received, and it gives the referee great pleasure to say that all but one sent in his results in good time for this meeting, and that one was prevented by sickness. It certainly speaks well for the interest manifested in this line of work, but the referee hopes that a greater number will assist in future co-operative work. It is the referee's intention to have appointed a number of associate referees as soon as feasible to take up certain lines of work, and every university, college, manufacturing house, board of health and pharmacy, and the individual chemist should take a part in this important work. It can readily be seen that the workers are far too few for the task.

There are a number of distinct benefits to be gained by such collaborative work. First, is the benefit conferred on this Association and the Association of Official Agricultural Chemists in assisting them to study and establish standards for analytical methods. Second, the benefit derived by science; for accurate data are absolutely necessary for outlining methods of analyses. And, last, the great benefit derived by the worker himself. If he is in any way inaccurate, or his work is defective, he will soon find it out in collaborative work and be able to correct any fault he may find.

Dr. Wiley, in some recent remarks, appealed to the young men to take part in co-operative work. He emphasized this by saying, "I would not have a chemist in my bureau who would not take part in this referee work. I not only require it, but give every opportunity for doing it."

The powdered opium sent out for analysis was taken from a five-pound container which was purchased on the open market. The opium was thoroughly mixed before any was sent out. The label on the can stated that the opium contained 14.01 per cent. of morphine. The results obtained by the various workers are contained in the tables below:

TABLE OF RESULTS OF CO-OPERATIVE WORK ON OPIUM, A. O. A. C., 1904. METHOD I—U. S. P., 1890, WITH ADDITIONS.

NAME.	Amount of morphine on filter paper, per cent.	Average per cent.	Amount of morphine on water glass, per cent.	Average per cent.	Purity by acid titration, per cent.	Purity by KOH, or Lyons [†] method, per cent.	Purity by line water, per cent.	Morphine in opium by acid titration, per cent.	Morphine in opium by Lyons [†] method, per cent.	Morphine in opium by line water, per cent.	Moisture at 110° C., per cent.	Remarks.
Blome.....	13.56	13.59	13.46	13.477	96.916	92.22	94.76	13.06	12.42	12.72	5.5	Stood 24 hrs.
Blome.....	13.63	13.63	13.495	13.495	96.916	90.47*	85.86*	14.00*	13.34*	12.66*	5.92	
Blome.....	14.70*	14.80*	14.70*	14.75*	94.94*	90.47*	85.86*	14.00*	13.34*	12.66*	5.92	
Blome.....	14.85*	14.85*	14.85*	14.85*	94.94*	90.47*	85.86*	14.00*	13.34*	12.66*	5.92	
Dohme.....	13.59	13.47	13.36	13.25	98.64	94.83	95.98	13.06	12.56	12.77	6.8	
Dohme.....	13.36	13.36	13.36	13.36	98.41	95.22	94.60	13.24	12.81	12.73	6.53	
Dohme.....	13.65	13.64	13.49	13.46	98.41	95.22	94.60	13.24	12.81	12.73	6.53	
Dohme.....	13.65	13.64	13.49	13.46	98.41	95.22	94.60	13.24	12.81	12.73	6.53	
Doolittle.....	9.786*	9.75*	9.69*	9.64*	98.55	98.61					6.64	
Doolittle.....	9.715*	9.715*	9.66*	9.64*	98.55	98.61					6.64	
Havenhill.....	14.31	13.97	14.305	13.912	96.91†	93.16†	91.80†	13.48	12.96	12.77	6.74†	
Havenhill.....	13.63	13.63	13.53	13.99	96.91†	93.16†	91.80†	13.55	13.05	12.84	6.74†	
Havenhill.....	14.24	14.09†	14.12	13.99	96.91†	93.16†	91.80†	13.55	13.05	12.84	6.74†	
Havenhill.....	13.955	13.55	13.87	13.43	96.60	91.98	94.60	12.97	12.35	12.70	7.05	Ash per cent., 1.80.
Kebler.....	13.61	13.55	13.50	13.41	97.00	93.08	96.64	13.00	12.48	12.95	6.90	Ash per cent., 2.01.
Kebler.....	13.50	13.51	13.45	13.41	97.00	93.08	96.64	13.00	12.48	12.95	6.90	Soluble in com- mercial alco- hol, 95%
Kebler.....	13.54	13.51	13.45	13.41	97.00	93.08	96.64	13.00	12.48	12.95	6.90	Morphine by Mallinckrodt Chem. Works
Kebler.....	13.48	13.77	13.36	13.64	97.91†	93.57†	95.65	13.35	12.76	13.04	6.6	Morphine by Mallinckrodt Chem. Works
Lyons.....	13.81	13.77	13.68	13.64	97.91†	93.57†	95.65	13.35	12.76	13.04	6.6	Method, 12.98†
Lyons.....	13.74	13.77	13.68	13.64	97.91†	93.57†	95.65	13.35	12.76	13.04	6.6	
Mallinckrodt Chem. Works.	14.36	14.30	14.19	14.25	94.41	91.03	89.20	13.44	12.97	12.70	6.6	
Mallinckrodt Chem. Works.	14.24	14.31	14.31	14.25	94.41	91.03	89.20	13.44	12.97	12.70	6.6	
Mallinckrodt Chem. Works.	13.78	14.01	13.73	13.96	97.36	92.63	92.10	13.59	12.93	12.85	6.96	
Mallinckrodt Chem. Works.	14.25	14.10	14.10	14.25	97.36	92.63	92.10	13.59	12.93	12.85	6.96	
Puckner.....	13.70	13.59	13.47	13.31	97.11	92.41	94.94	12.82	12.90	12.54		
Puckner.....	13.35	13.35	12.95	13.21	96.37	91.39	89.60	12.47	11.83	11.60		
Puckner.....	13.90†	14.16	13.83	14.09	96.50	92.02	91.44	13.59	13.09	12.88	6.88	
Puckner.....	14.24†	14.16	13.83	14.09	96.50	92.02	91.44	13.59	13.09	12.88	6.88	
Ruddiman.....	14.31	14.09	14.09	14.04	97.32	88.53	86.33	13.66	12.42	12.38	7.07	
Ruddiman.....	13.68	14.09	14.09	14.04	97.32	88.53	86.33	13.66	12.42	12.38	7.07	
Ruddiman.....	14.30	14.25	14.24	14.20	96.41	88.53	91.30	13.69	12.57	12.96	7.06	
Ruddiman.....	14.31	14.25	14.24	14.20	96.41	88.53	91.30	13.69	12.57	12.96	7.06	
Smith.....	14.58*	14.68*	14.50*	14.55*	96.42	97.02	96.00	14.02*	14.11*	13.96*	6.06	
Smith.....	14.67*	14.68*	14.68*	14.55*	96.42	97.02	96.00	14.02*	14.11*	13.96*	6.06	
Smith.....	14.59*	14.68*	14.53*	14.58*	96.41	97.02	95.90	14.05*	14.14*	13.98*	6.10	
Smith.....	14.60*	14.68*	14.53*	14.58*	96.41	97.02	95.90	14.05*	14.14*	13.98*	6.10	
Average.....	13.85	13.85	13.74	13.74	96.99	91.21	93.09	13.30	12.67	12.65	6.68	
Maximum.....	14.49	14.30	14.35	14.25	98.64	98.61	96.64	13.86	13.46	13.04	7.10	
Minimum.....	13.36	13.47	13.05	13.21	94.41	88.53	86.33	12.47	12.80	11.60	5.50	
Difference.....	1.06	0.83	1.40	1.04	4.23	10.08	10.31	1.39	1.26	1.44	1.60	

* Not included in average, maximum and minimum results.
† Results obtained by mixing morphine of both sets of duplicates.
‡ U.S.† porcelain Gooch crucible, provided with paper disk, all dried to constant weight.

TABLE OF RESULTS OF CO-OPERATIVE WORK ON OPIUM, A. O. A. C., 1904, METHOD II., U. S. P., 1880, ETC., MODIFIED.

NAME.	Amount of morphine on filter, per cent.	Average per cent.	Amount of morphine on watch-glass, per cent.	Average per cent.	Purity by acid titration, per cent.	Purity by KOH or Lyon's method, per cent.	Purity by line water, per cent.	Morphine in opium by acid titration, per cent.	Morphine in opium by KOH or Lyon's method, per cent.	Morphine in opium by line water, per cent.	Moisture at 110° C. per cent.	Per cent. of ash 0.3.
Blome.....	11.698	11.61	11.59	11.512	96.00	97.12	93.4	11.05	11.18	10.75	6.46	
Blome.....	11.435	11.70	11.435	11.60	98.806	98.03	99.37	11.39	11.37	11.52	6.63	
Blome.....	11.87	11.90	11.81	11.78	98.76	98.95	99.2	11.63	11.57	11.68	7.0	
Dohne.....	11.93	11.75	11.05	11.26	98.77	98.4	99.6	11.12	11.07	11.21	6.6	
Dohne.....	11.64	11.43	11.48	9.468*	99.51	96.60	.....	9.41*	9.14*	.....	6.32	
Doolittle.....	9.396*	9.504*	9.33*	11.777	.....	.....	99.99†	.....	.....	.....	6.62	
Doolittle.....	9.712*	11.21	11.21	11.337	.....	.....	99.99†	.....	.....	.....	6.62	
Havenhill.....	11.25	11.235	11.14	11.25	98.75	97.62	99.10	11.10	10.98	11.33	6.03	
Havenhill.....	11.22	11.42	11.267	11.25	96.05	94.30	97.86	13.23†*	12.99†*	13.48†*	5.90	
Havenhill.....	11.33	11.35	11.33	13.78†*	97.99§	99.19§	99.7	11.93	11.84	11.90	6.70	
Kebler.....	11.46	13.06†*	11.18	11.94	98.9	99.00	99.7	11.11	11.19	11.90	6.8	
Kebler.....	14.22†*	13.06†*	14.00†*	11.24	97.02	97.07	100.00	10.42	10.42	10.75		
Kebler.....	13.70†*	13.06†*	13.56†*	10.75	98.6	98.7	98.0	14.42*	14.43*	14.45*	6.0	
Kebler.....	12.05	12.01	11.88	14.64*	97.92	97.94	98.0	14.37*	14.37*	14.38*	6.05	
Lyons.....	11.97	12.01	11.88	11.39	98.05	97.68	98.7	11.22	11.19	11.26	6.51	
Lyons.....	11.25	11.26	11.21	11.04	98.9	99.10	100.00	11.93	11.84	11.90	7.00	
Mallinckrodt Chem. Works.....	11.25	10.85	10.72	10.54	97.02	97.07	98.0	10.42	10.42	10.75	5.90	
Mallinckrodt Chem. Works.....	11.20	10.85	10.72	14.64*	98.54	97.94	98.0	14.42*	14.43*	14.45*	6.0	
Ruddiman.....	10.82	10.42	10.78	11.04	97.92	97.94	98.0	14.37*	14.37*	14.38*	6.05	
Ruddiman.....	10.69	10.42	10.74	11.39	98.05	97.68	98.7	11.22	11.19	11.26	6.51	
Ruddiman.....	10.40	10.42	10.74	11.04	98.9	99.10	100.00	11.93	11.84	11.90	7.00	
Ruddiman.....	10.45	10.42	10.74	10.54	96.0	94.30	93.40	10.42	10.42	10.75	5.90	
Smith.....	14.05	14.70*	14.60*	14.64*	97.92	97.94	98.0	14.42*	14.43*	14.45*	6.0	
Smith.....	14.76*	14.70*	14.68*	11.39	98.05	97.68	98.7	11.22	11.19	11.26	6.51	
Average.....	.....	11.38	.....	11.04	98.05	97.68	98.7	11.22	11.19	11.26	6.51	
Maximum.....	12.05	12.01	11.97	10.54	98.9	99.10	100.00	11.93	11.84	11.90	7.00	
Minimum.....	10.40	10.42	10.34	10.54	96.0	94.30	93.40	10.42	10.42	10.75	5.90	
Difference.....	1.65	1.59	1.63	1.40	2.0	4.89	6.60	1.51	1.42	1.15	1.10	

* Not included in average, maximum and minimum results.

† Result obtained by mixing morphine of both sets of duplicates.

‡ Acid standardised against morphine.

TABLE OF CO-OPERATIVE WORK ON OPIUM, A. O. A. C., 1904. METHOD III—STEVENS.

NAME.	Without Correction.				Average per cent.	With Correction, Factor—1.12.				Average per cent.
	Per cent.	Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.	Per cent.	
Blome.....	11.80	11.17	11.29	11.32	11.24	12.32	12.29	12.41	12.44	12.36
Dohse.....	11.97	11.68	11.86	11.83	11.83	13.09	12.80	12.98	12.95	12.95
Doolittle.....	11.78	.....	.....	.....	11.72	12.54	.....	.....	.....	12.84
Havenhill.....	11.33	11.35	11.48	11.44	11.40	12.45	12.47	12.60	12.56	12.52
Kabler.....	11.52	11.67	11.47*	10.95*	11.19	12.64	12.79	12.59*	12.07*	12.31
Lyouis†.....	12.00†	12.14†	11.82*	.....	11.99*	13.12†	13.26†	12.94*	.....	13.11†
Mallinckrodt Chem. Works..	11.01	11.14	.....	.....	11.07	12.13	12.26	.....	.....	12.19
Puckner.....	11.36	11.53	11.22	11.25	11.34	12.48	12.65	12.34	12.37	12.46
Ruddiman.....	11.27	11.20	.....	.....	11.23	12.39	12.32	.....	.....	12.35
Smith.....	12.93†	12.85†	12.81†	.....	12.86†	14.05†	13.97†	13.93†	.....	14.01†
Average.....	11.42	11.39	11.52	11.55	11.37	12.54	12.58	12.66	12.47	12.49
Maximum.....	11.97	11.68	11.86	11.83	11.83	13.09	12.80	12.98	12.95	13.00
Minimum.....	11.01	11.14	11.22	10.95	11.07	12.13	12.26	12.35	12.07	12.19
Difference.....	0.96	0.54	0.64	0.88	0.76	0.96	0.54	0.63	0.88	0.81

* Per cent. by weight.

† Stood 36 hours before morphine was separated.

† Acid standardized by morphine.

‡ Not included in average, maximum and minimum results.

The results obtained by volumetric solutions are all calculated to the molecular weight of the 1890 Pharmacopœia, except in the case of Stevens' method, which it was deemed undesirable to change. It is very desirable to use uniform molecular weights, and it was the referee's intention that the pharmacopœial molecular weights should be used in all the work, but even if this has not been done the variations from this cause are very small when compared with the great differences of the various workers due to manipulation and other unknown factors.

Some consider it necessary to standardize the acid against the alkaloid to be titrated. The referee, however, dissents from this view, holding that such a procedure would introduce unnecessary details. The methods for determining alkaloids volumetrically ought not to require a system of adjusting standard solution, which differs from present methods, unless some good reason exists, which does not appear to be the case for this work.

The above results are far from satisfactory. Two separate workers at most ought not to vary more than one-half per cent. in amount of morphine, but the difference between the highest and the lowest of the above results exceeds five per cent. of actual morphine, which is remarkable. Even excluding the highest and the lowest results, and such which for any reason appear abnormal, the differences between the maximum and minimum figures in methods I and II are two to three times too great, while in Steven's method the difference is considerably less.

The per cent. of water in the morphine of the various workers seem to lie within the limits of error, but shows that it slightly exceeds the one molecule of water customarily considered to be present. Theoretically, crystallized morphine contains 5.85 per cent. of water of crystallization, while the average of all the above results is 6.62 per cent.

The percentage of purity of the morphine by Method I varies considerably, the greatest difference being with lime water, and Lyon's method, where it amounts to over 10.00 per cent. The morphine obtained by Method II, shows a high purity, and the results of the various methods are fairly concordant.

According to Blome's results in Method I, the element of time is a very important factor; this has, however, often been noted by other workers. Smith's results for all methods are very high, but it should be observed that the purity of morphine is very good, which looks as if this worker secured more morphine than the rest did.

The Chair said the papers would take the usual course.

Mr. Daniel Base presented in abstract the following :

REPORT ON THE EXAMINATION OF SOME OFFICIAL DRUGS.

BY DANIEL BASE.

During two months of this summer I was engaged with the examination of samples of drugs submitted by various firms as meeting pharmacopœial requirements as to purity and strength. The drugs were to be purchased in large quantity, and the samples represented the quality of the drugs offered. The purpose of the examination was to discover to what extent adulteration was practiced, as well as how completely or incompletely the drugs were freed from those impurities incident to manufacture, and whether they were of required strength in those cases where assay methods were applicable. The majority of the samples came from four large firms, of which one was a large jobber, and among the rest of the samples, nine firms were represented, the majority of them by one or two drugs. In only a few cases were there more than one sample of the same drug. It is gratifying to note that in only two cases was adulteration practiced, namely, in powdered asafetida and oil of wintergreen. The former will not cause any surprise when it is remembered that pure asafetida in the market is an exceptional occurrence. In another instance, namely, iodoform gauze, the strength found was practically half that claimed. Some of the drugs containing slight and harmless impurities, but not permitted by the present Pharmacopœia, and which therefore were not up to official requirements, would probably pass muster when tested by the 1900 Pharmacopœia, since, as I am informed, the requirements in certain instances will be less exacting than now. One hundred and fifteen samples were examined, the majority of which were satisfactory. Twenty six samples were unsatisfactory, chiefly because of the failure on the part of the manufacturers to sufficiently purify the drugs to meet the official demands, and to a less degree because of deficiency in strength. Of the unsatisfactory samples, eleven came from one of the four firms supplying the majority of the drugs, nine from another, and three from another.

The following drugs were satisfactory and no comment need be made on them :

Potassium bromide.	Calomel.
Sodium bromide.	Ammoniated mercury.
Ammonium bromide.	Yellow mercurous iodide.
Sodium iodide.	Red mercuric iodide.
Potassium citrate.	Mercuric chloride.
Sodium carbonate.	Bismuth subnitrate (2 samples).
Ammonium iodide.	Zinc acetate.
Potassium iodide.	Iron sulphate.
Sodium salicylate.	Boric acid.
Ammonia water (10 per cent.).	Monse's Solution.
Tincture of iodine.	Ferric pyrophosphate.
Iodine resublimed.	Mercurial ointment.

Ammonium chloride.	Nitric acid (C. P.).
Absolute alcohol.	Oil of cloves.
Chloral hydrate.	Olive oil.
Gamboge.	Menthol.
Flax seed, powdered.	Salicin.
B-naphthol.	Acetanilid.
Cinchonidine sulphate.	Phenacetin.
Balsam of Peru.	Antipyrine.
Expressed oil of almond.	Quinidine sulphate.
Oil of peppermint.	Iodoform.
Oil of anise.	Aristol.
Oil of santal.	Quinine sulphate.
Oil of sweet orange.	Fluid extract belladonna root.
Strychnine sulphate.	Codeine.
Atropine sulphate.	Caffeine.
Cocaine hydrochlorate.	Spirit nitrous ether.
Powdered extract nux vomica (2 samples).	Citrate iron and quinine.
Aromatic spirit of ammonia.	Chloroform venale.
Benzoic acid from benzoin.	Liquid petrolatum.
Acacia 1st (tears),	Creosote (beechwood).
Capsicum (powdered).	Black mustard.
	Ceylon Cinnamon (powdered).

The following drugs were satisfactory and seem to merit some comment :

Chlorinated lime—contained 38.4 per cent. available chlorine, which is much higher than is found in many specimens in the market.

Sulphuric acid (C. P.)—contained 96.24 per cent. of absolute acid. U. S. P. requires for minimum 92.5 per cent.

Amyl nitrite—contained over 96 per cent. of nitrite. U. S. P. requires about 80 per cent.

Hydrochloric acid—contained 36.5 per cent. U. S. P. requires only 31.9 per cent.

Hydrogen dioxide (3 per cent.).

a. Contained 3.58 per cent. (Permanganate method).

b. Contained 3.16 per cent. (Permanganate method).

Iron and strychnine citrate—contained 19.2 per cent. of iron. U. S. P. requires about 16 per cent.

Iron and ammonium citrate (soluble)—contained 19.2 per cent. of iron. U. S. P. requires about 16 per cent.

Iron and potassium tartrate—contained 18.12 per cent. iron. U. S. P. requires about 15 per cent.

These iron salts seem to be a case of giving "down weight."

Formaldehyde (assayed by H_2O_2 and Alkali method).

a. 40 per cent. solution—contained 35.74 per cent. by weight or 38.88 per cent. by volume.

- b. 40 per cent. solution—contained 37 per cent. by weight.
- c. 40 per cent. solution—contained 36.96 per cent. by weight.
- d. 40 per cent. by volume—contained 37 per cent. by weight or 43.4 per cent. by volume.

Glycerin, a. b. c. All good.

Yellow and white wax (same firm).—The yellow wax had the sp. gr. 0.964 at 15° C., acid number, 19.56, ester number, 76.76. The white wax had the sp. gr. 0.96. It was lighter than the yellow wax, floating in alcohol in which the yellow sank. Most books and the U. S. P. give the average sp. gr. for white wax higher than the average for yellow. The "Digest of Criticisms" of the U. S. P. quotes one writer, Evers, who states that yellow wax is heavier than the white. The melting-point, acid figure, saponification figure, sp. gr., and other tests, showed this white wax to be pure, but, contrary to statements in hand-books, one hour's boiling was not sufficient to completely saponify the wax, in fact one-and-a-half hours' boiling was not enough. After this period of boiling, the saponification figure was 65, with three hours' boiling it was 94.08.

Quinine sulphate.—The U. S. P. test for quinidine in this salt by addition of potassium iodide, T. S., gave positive or negative results according as the "cold saturated aqueous solution" of the sulphate was prepared at ordinary temperature, or at 15° C. The present U. S. P. direction is somewhat indefinite in this test as to temperature.

Oil of lavender flowers.—This seemed to be free from adulteration, but apparently was a low-grade oil, as it contained 25.25 per cent. of ester, linaloyl acetate. A good oil should contain at least 34 per cent.

The following samples were unsatisfactory:

Hydrobromic acid (dilute).—Contained considerable sulphuric acid.

Lithium bromide.—Contained a good proportion of sulphate, left appreciable residue when dissolved in absolute alcohol, and contained only 92.36 per cent. lithium bromide. U. S. P. requires 98 per cent.

Potassium hydroxide, pure in sticks.—Its solution turned dark with ammonium sulphide, and it contained 1.26 per cent. of chloride, while U. S. P. allows only 0.25 per cent. Strength, 82.84 per cent. Official is 90 per cent.

Sodium hydroxide, pure in sticks.—Contained 2.4 per cent. chloride. U. S. P. allows only 0.24 per cent. Strength, 94 per cent.—4 per cent. more than required.

Potassium acetate.—Contained an appreciable amount of sulphate, and four times as much chloride as the U. S. P. allows, namely, 0.28 per cent.

Yellow oxide of mercury.—Left residue when heated to redness, which contained iron, also was incompletely soluble in dilute nitric acid.

Red oxide of mercury.—Contained nitrate, and left a residue on heating, containing iron.

Morphine sulphate.—Gave decided reddish-yellow color with concen-

trated sulphuric acid. U. S. P. allows not more than a faintly yellowish tinge. The free alkaloid, dissolved in alkali and extracted with ether, yielded an excessive residue (narcotine, codeine, etc.), while a specially purified morphine gave an insignificant film of residue. U. S. P. allows only a scarcely perceptible residue.

Muriate of morphine.—The alkaloid from one gram of the salt, extracted with ether, gave 12.3 Mgm. of residue, while an equivalent amount of pure morphine, treated likewise, gave only 1.2 Mgm. of residue, or one-tenth as much.

Acetate of morphine.—Was grayish-pink in color, and one gram treated as above gave 7.2 Mgm. of residue.

Zinc acetate, pure U. S. P.—Did not give a clear solution, even when heated with acetic acid. Contained an appreciable amount of sulphate and much more chloride.

Acacia, powdered.—Did not dissolve completely. Apparently it was prepared from dirty acacia.

Asafetida, powdered.—Gave 31.06 per cent. ash. Contained calcium carbonate, and had only 45.5 per cent. soluble in alcohol.

Hydrocyanic acid, 2 per cent. solution.

a. Contained 1.53 per cent.

b. Contained 1.51 per cent. HCN.

These probably were two per cent. when bottled, but had deteriorated.

Ammonia water.—Contained 8.6 per cent., instead of 10 per cent., as required.

Purified chloroform (for anæsthesia).—Showed presence of decomposition products, and small quantity of chlorine compound reacting with silver nitrate.

Iodoform gauze, 10 per cent.—Contained only 5.3 per cent. of its weight in iodoform.

Ether (for anæsthesia).—Left appreciable residue upon evaporation. By U. S. P. test, shrinkage when shaken with water was 3.68 per cent. of its volume, limit allowed, 1 per cent.

Quinine sulphate.—Gave a decidedly yellow color to conc. sulphuric acid, and contained excessive amount of other cinchona alkaloids.

Antimony and potassium tartrate.—Contained a trace of iron, and Bettendorff's test gave a rather brown coloration, showing the presence of arsenic.

Mercury with chalk.—Contained appreciable amount of mercuric compound.

Glycerin.—By evaporation, left an appreciable black residue, and gave a strong rancid odor when warmed with dil. sulphuric acid. It contained a trace of chlorine and reduced Fehling's solution almost immediately in the official test.

Bismuth subcarbonate.—Contained too much sodium carbonate and an appreciable amount of chlorine.

Oil of wintergreen (finest).—Did not dissolve to clear solution in warm alkali. This solution, extracted with benzin, yielded a greasy, oily residue. This was not examined further, because of the small quantity of the sample.

Calcined magnesia.—Aqueous extract left residue of sodium carbonate on evaporation. Solution of the oxide in dilute hydrochloric acid had a distinct yellow color, and showed considerable iron. Some sulphate was also present.

As a result of the above examination, the conclusion seems to be justified that, although there was scarcely any attempt at adulteration in the specimens tested, there certainly is need of greater care in the manufacture of some of them to free them from impurities so they may fulfil the claims made, namely, that they meet the requirements of the Pharmacopœia. Perhaps a good way to compel such improvement is for purchasers to have all articles examined and to reject such as do not meet the requirements of the Pharmacopœia; this course would be decidedly justified whenever a manufacturer or jobber agreed to furnish strictly U. S. P. articles.

Dr. Reid Hunt, Pharmacologist of the U. S. Public Health Service, told of a recent examination of some two hundred samples of chemicals in his service, and said it was encouraging to note that, while only thirty-six came up absolutely to the standards of the Pharmacopœia, there was not one where the impurity found could be declared injurious, and only one case where the strength of the drug was so impaired as to fail to give the result desired by the physician. The point he wished to emphasize especially was, that, even if there are impurities in these chemicals, many times they are harmless, and the strength of the substance is sufficient anyhow to produce the desired physiological effect. He said they believed in and followed the Pharmacopœial standards, and when drugs did not come up to them they were returned. His branch of the Service had the advantage of being able to buy the best drugs, without being restricted to the lowest in price. He thought some of Mr. Kebler's troubles with impure chemicals were probably due to the fact that his bureau did not have this option.

The paper was, on motion, received and referred.

Mr. L. F. Kebler then presented in abstract the following:

NOTES ON THE METHODS OF DETECTION OF ADULTERATION IN OLIVE OILS.

BY L. M. TOLMAN, BUREAU OF CHEMISTRY, WASHINGTON, D. C.

In an examination of oils for adulteration two cases present themselves. One where gross adulteration or substitution of another oil has been practiced, and the other where only small amounts of the foreign oil have been added.

With samples that come under the first head, a great deal of valuable information as to the nature of added oil can be obtained by determinations of the physical and chemical constants such as specific gravity, index of refraction, iodine number, etc., as most of the oils used for mixing with olive have quite different numbers. The U. S. P. gives the limits for olive oil for two of these, the specific gravity and iodine number. But as has been shown,* the specific gravity is lowered to a marked degree by the presence of free fatty acids, and these should be determined before any judgment is based on the specific gravity of an oil. In fact it is the practice in this laboratory to make a determination of the amount of free fatty acids present at the beginning of the examination of an oil. Then a judgment can be made as to the condition of the oil and anomalous results perhaps explained.

The amount of free fatty acids is easily determined by taking a weighed quantity of the oil, adding 25 Cc. of neutral 95 per cent. alcohol, heating to boiling and titrating with $\frac{N}{10}$ alkali, using phenolphthalein as an indicator, the results being expressed as oleic acid.

A normal good grade of salad oil should not contain more than 1.50 to 2 per cent. of free acid determined in this way, and high grades of oil will have 1 per cent. or less.

It will be seen, however, that when the U. S. P. allows a range of 80 to 88 on the iodine number and .915 to .918 on the specific gravity that adulteration with small quantities of cotton seed, sesame or corn oil, will not be detected and color reactions or similar qualitative tests must be relied on.

While if such oils as peanut or lard are used which differ † so slightly from olive oil in their various numbers, large amounts could be added without affecting these figures, and little information would be obtained by their determination.

Especially is this true of peanut oil which is at the present time a very widely used adulterant of olive oil.

A number of samples of high-grade imported peanut oils have been examined recently in the Food Division of the Bureau of Chemistry, which would easily come within the limits given for pure olive oils, as regards specific gravity, iodine number, index of refraction and which are so purified that they do not give the ordinary tests used for detection of seed oils.

These are pleasant, bland oils, do not have a strong flavor, and might easily be passed as olive oils unless examined for the presence of arachidic acid, a fatty acid occurring in this oil to the extent of 4 to 5 per cent.

As most of the samples of adulterated oils which are examined come

* U. S. Dept. of Agriculture, Bureau of Chemistry, Bull. 77, p. 14.

† U. S. Dept. of Agriculture, Bureau of Chemistry, Bulletin 77, pp. 44-45.

under the second class where only small amounts of foreign oil are present, we are almost entirely dependent on the qualitative or color tests for its detection. Most of these tests are more or less misleading to the inexperienced worker, and to give an explanation in detail of the causes of some of these results and to show how to avoid an erroneous judgment as to the purity of olive oil is the object of this paper.

The Baudouin or Villavecchia test for sesame oil is an example of this sort of test. It depends on the formation of a red or crimson color with sugar and hydrochloric acid, or furfural and hydrochloric acid, and so far as is known no pure oil except sesame gives this reaction. But it is also found that a number of pure olive oils give a red coloration with this reagent, which sometimes is difficult to distinguish from the sesame color. The color produced by pure olive oil is, however, different from that produced by sesame oil, and is produced by a different substance. The substance in sesame oil which produces the reaction is a yellow oil, which is insoluble in alcohol and water, while the substance in olive oil which gives the red color is readily soluble in water or alcohol. There are several ways of deciding as to whether the color is due to sesame oil or not. If furfural and HCl are used in making the test, one can distinguish between the true and the false test by allowing to stand for $\frac{1}{2}$ to $\frac{3}{4}$ of an hour and then observing. If the color is still deep crimson it is due to sesame oil, while if it has changed to a brown or black it is the reaction, given by the olive oil itself. If HCl and sugar are used in making the test the blackening due to the action of the acid on the sugar will cover up this effect and other means must be resorted to. This can be done by adding to the colored acid solution twice its volume of water, and if the color is due to sesame, it does not fade, while if due to the olive oil itself the color disappears. It is well when the sugar and HCl are used, to mix the two in the test-tube, as the acid very rapidly acts on the sugar. The chief advantage of the furfural solution proposed by Villavecchia, is that it is only slowly acted on by the acid, and a definite strength of solution can be kept in stock. The solution used is 2 grams furfural dissolved in 100 Cc. of 95 per cent. by volume alcohol, and .1 Cc. of this solution is used in making a test. It is much more satisfactory, however, to purify the oil before making the examination. The insolubility in alcohol of the color-producing substance in sesame oil, together with the fact that the impurity present in olive oil which gives the test is readily soluble, at once suggests a means of purifying the oil.

The method as applied in this laboratory is the same as was suggested by the author for use with Becchi test.*

Place 25-30 Cc. of the oil in a separatory funnel and shake thoroughly with hot alcohol, allow to separate, remove the alcohol and wash with hot

* Journal American Chemical Society, 1902, 24, 396.

water, and use this oil for the tests. In order to get rid of this false reaction the U. S. P. recommends that the fatty acids be prepared, washed and dried, and the test made on these, but the method given above is much simpler and more rapid, and completely removes the interfering substance.

Pure olive oils which give a strong coloration, almost impossible to distinguish from reactions given by oils adulterated with sesame oil, after this treatment give no reaction, or only the slightest tinges of color, while olive oils adulterated with as little as 1 to 2 per cent. of sesame oil give an undiminished test.

The author in a recent examination of some eighty samples of Italian and Spanish oils of known origin found six samples which gave a bright red coloration with the furfural before they had been purified. These oils had another peculiarity. They all had a very strong acrid taste, and all the oils which have been examined in this laboratory and gave this color reaction have had this peculiar taste. The taste is much like that of the olive itself, which has not been treated, and is probably derived from the pulp of the fruit, and, while ordinarily removed from the oil in the process of manufacture, remained behind in these samples, perhaps through accident or carelessness. A sample of oil which gave the reaction when first received, lost it on standing six months.

Experiments are now being carried on by Mr. L. F. Kebler and myself to determine the exact nature of this body.

The best procedure in testing an oil for sesame is first to purify by shaking with alcohol, wash with hot water, and test with the use of a 2 per cent. solution of furfural and HCl. If this scheme is followed no mistake will be made.

The Becchi or silver nitrate test for cotton-seed oil is another of those tests which often give misleading results.

A great many pure olive oils which are perhaps slightly rancid or contain some accidental impurity, as was found in the oils giving the red coloration with furfural, will give a slight reduction with silver nitrate and at once raise a question as to its purity, so that it is necessary to purify the oil in this case the same as in the previous test. This is accomplished in exactly the same manner as for the sesame oil test, so that the oil which has been purified may be used in both examinations.

It is often recommended that the test be made on the fatty acids, but the preparation of these is tedious and unnecessary. Especially is it necessary, if this test is to be applied to lard or lard oil, that the fats be carefully purified, as there are almost always present in these products substances that will give a reduction with silver nitrate.

Olive oils do not show the slightest reduction with silver nitrate if they are purified in this manner, and the presence of 5 per cent. of cotton-seed oil is easily recognized. But the Becchi test is fast going out of use, be-

cause a much more delicate and satisfactory test has been suggested by Halphen; that of treating the oil with an equal volume of a mixture consisting of CS_2 , containing 1 per cent. of sulphur, and amyl alcohol. An oil containing cotton-seed oil becomes bright crimson on being treated with this reagent and heated for 15 minutes to 1 hour.

When a positive test is obtained on olive oil with this reagent it is proof of the presence of cotton-seed oil. But neither this test nor the Becchi, when applied to the detection of cotton-seed oil in lard or lard oil, is absolute evidence of adulteration as shown by Fulmers'* recent experiments on hogs fed on cotton-seed meal, in which he found that the lard prepared from these animals gave strong tests for cotton-seed oil. The only way the question of the adulteration of such lards or lard oils can be settled is by Bomer's† phytosterol acetate test. By this method as little as 2 per cent. of added cotton-seed oil can be detected, the lards from cottonseed fed hogs acting like pure lards with this test.

The writer, in a report to the Association of Official Agricultural Chemists, published in their Proceedings,‡ recommended that in making the Halphen test the brine bath should boil at from 112°C . to 115°C ., and the test kept at this temperature for from 1 to 2 hours. The reason for this is that heated cotton-seed gives the test only after 1 to 2 hours' boiling in the brine bath. Kapok oil is the only oil besides cotton-seed oil known to give the Halphen reaction. This is an oil closely related to cotton-seed oil, chemically, and, perhaps, may be used in mixing with olive oil, but it would, however, hardly be necessary to distinguish between this oil and cotton-seed oil in the examination of olive oils, as they would both be adulterants.

As has been mentioned before, it is probable that peanut oil is more widely used as an adulterant of olive oil than is usually supposed, and the fact that it is so similar to olive oil in its physical and chemical constants, and that there is no color reaction for its detection in small amounts, makes it the hardest to detect. The method used in the Bureau of Chemistry in its inspection work is a modification of Renard's method given in the Provisional Methods for Food Analysis, with the Modifications§ given in the Report to the Association of Official Agricultural Chemists|| in their Proceedings.

This method is as follows:

Weigh 20 Gm. of oil into an Erlenmeyer flask. Saponify with alcoholic potash, neutralize exactly with dilute acetic acid, using phenolphthalein as indicator, and wash

* Journal of American Chemical Society, 1904, 26, 837.

† Zeits. f. Nahr. u. Genuss, 1901, 4, 1070.

‡ U. S. Dept. of Agri. Bu. of Chem. Bull., 81, p. 64.

§ U. S. Dept. of Agri., Bu. of Chem., Bull. No. 65, p. 31.

|| U. S. Dept. of Agri., Bu. of Chem., Bull. No. 81, p. 64.

into a 500-Cc. flask containing a boiling mixture of 100 Cc. of water and 120 Cc. of a 20 per cent. lead acetate solution. Boil for a minute, and then cool the precipitated soap by immersing the flask in water, occasionally giving it a whirling motion to cause the soap to stick to the sides of the flask. After the flask has cooled, the water and excess of lead can be poured off and the soap washed with cold water and with 90 per cent. (by volume) alcohol. Now add 200 Cc. of ether, cork the flask and allow to stand for some time until the soap is disintegrated, then heat on the water-bath, using a reflux condenser and boil for about five minutes. (a) In the oils most of the soap will be dissolved, while in lards, which contain so much stearin, part will be left undissolved. Cool the ether solution of soap down to from 15° to 17° C., and let stand until the insoluble soaps have crystallized out—about twelve hours are required.

Filter and thoroughly wash the precipitate with ether. The soaps on the filter are washed back into the flask by means of a stream of hot water acidified with hydrochloric acid. Add an excess of dilute hydrochloric acid, partially fill the flask with hot water, and heat until fatty acids form a clear, oily layer. Fill the flask with hot water, allow the fatty acids to harden and separate from the precipitated lead chloride; wash, drain, repeat washing with hot water, and dissolve the fatty acids in 100 Cc. of boiling 90 per cent. (by volume) alcohol. Cool down to 15° C., shaking thoroughly to aid crystallization. From 5 to 10 per cent. of peanut oil can be detected by this method, as it effects a complete separation of the soluble acids from the insoluble, which interfere with the crystallization of the arachidic acid. Filter, wash the precipitate twice with 10 Cc. of 90 per cent. (by volume) alcohol, and then with alcohol of 70 per cent. (by volume). Dissolve off the filter with boiling absolute alcohol, evaporate to dryness in a weighed dish, dry and weigh. Add to this weight 0.0025 Gm. for each 10 Cc. of 90 per cent. alcohol used in the crystallization and washing, if done at 15° C.; if done at 20°, 0.0045 Gm. for each 10 Cc. The melting-point of arachidic acid obtained in this way is between 71° and 72° C. Twenty times the weight of arachidic acid will give the approximate amount of peanut oil present.

This method, if followed exactly, will give very satisfactory results.

In the course of our inspection of foreign olive oils a number of interesting cases have come to our attention, which are worthy of note in this connection.

A very common kind of mislabeling is in regard to the capacity of the receptacle used, especially in bottled goods. Bottles holding a little over a pint are labeled quarts and half-pints labeled pints.

Another case which, on the face of it seems incredible, is the importing of pure cotton-seed oil into this country from France. This oil was, however, in cans labeled salad oil, and doubtless would be sold as olive oil.

The most interesting case, however, that has come to our notice is the sending of French oil in bottles labeled California oil and consigned to San Francisco. This only serves to call strong attention to the fact, perhaps not as well known as it should be, that the California olive oil producer demands and receives a higher price on the market for his product than the best imported oils bring. This is due to the very high grade of olive oil that has been manufactured of late years in that State.

At the present time on account of the strict enforcement of the law regarding the inspection of imported oils, there is very little adulterated olive oil coming into this country.

Mr. Chas. E. Caspari presented the following two papers in abstract :

THE DETERMINATION OF CODEINE IN OPIUM.

BY CHARLES E. CASPARI.

It has always seemed strange that up to the year 1903 no method has ever been published for the determination of codeine in opium, especially as this alkaloid is such an important constituent of opium and is used so extensively. To be sure, every text-book and reference book on chemistry states the percentage of codeine contained in opium, which is said to vary from 0.20 per cent. to 0.60 per cent, and the question naturally arises, "On what are these figures based?" It seems to me that the only basis which they have is the yield of codeine obtained by manufacturers on the large scale, and it can by no means be taken for granted that manufacturers succeed in extracting and obtaining as such all the codeine contained in opium. Letters sent to various chemists throughout the country have elicited the common reply that no method for the determination of codeine is known. One would naturally suppose that manufacturers would be desirous of knowing the codeine content of opium as well as the morphine content, in order to know the efficiency of their methods of extraction, and yet no attempts to obtain this information seem to have been made previous to 1903.

In that year an article appeared by Van der Wielen in the *Pharmaceutische Zeitung*, page 267, on the determination of narcotine and codeine in opium. He had endeavored in vain to discover a method for the simultaneous determination of morphine and codeine. At the time that this article appeared the author was engaged in a similar piece of work, and succeeded in elaborating a method for determining codeine different from that of Van der Wielen.

In order to permit a comparison of methods and results, both methods will be given.

According to Van der Wielen, 3 Gm. powdered opium are shaken several minutes with 90 Cc. ether, 5 Cc. caustic soda (10 per cent. solution) are added and the mixture shaken frequently for 3 hours. Then, 3 Gm. calcium chloride are added, the whole allowed to stand 12 hours, and 75 Cc. of the ethereal solution representing 2.5 Gm. opium are poured off. Of this portion 60 Cc. ether are distilled off, the remainder is placed in a separatory funnel, the flask rinsed with 4 Cc. water and 1 Cc. dilute hydrochloric acid to dissolve the crystals which have separated from the ether and the ethereal solution is shaken with this aqueous solution. The aqueous layer is drawn off, and the flask and ethereal solution are shaken repeatedly with 5 Cc. portions of 2.5 per cent. hydrochloric acid until every trace of alkaloid has been removed. This step must be performed rapidly, as the liquid has a tendency to turn red in consequence of the decomposition of some of the narcotine. The mixed acid liquors are next shaken with 25 Cc. ether and

rendered alkaline with a 10 per cent. solution of caustic soda. The ether is drawn off in a flask containing 5 Gm. calcium chloride. It is shaken ten minutes with calcium chloride and filtered into a small flask. Then the alkaline aqueous liquid, the calcium chloride and the filter are treated with portions of 10 Cc. ether until all alkaloid has been removed. From the ethereal solution the ether is distilled off and the residue is dissolved in 4 Gm. 90 per cent. alcohol with the aid of heat. The alcoholic solution is allowed to stand 24 hours, and the crystals which separate out are collected on a filter, washed with 5 Cc. alcohol, and dried at 100° , then weighed. A correction must be added for the narcotine which remains in the alcoholic mother-liquor. The codeine is determined in the alcoholic filtrate from the narcotine and in the wash liquors. These are mixed and to the mixture are added 10 Cc. water; the whole is evaporated to a volume of 10 Cc., and allowed to stand 24 hours. During this time resinous masses separate out, and these are filtered off. Then the dish and filter are washed three times with 5 Cc. water. To the washings 5 Cc. $\frac{N}{1000}$ sulphuric acid are added, and also 3 drops hæmatoxylin. The excess of acid is determined by means of $\frac{N}{1000}$ alkali. From these figures can be calculated the amount of codeine present, using the formula $C_{18}H_{21}NO_3 + H_2O$ for codeine. According to this method Van der Wielen obtained the following results :

Asia Minor opium No. 1.....	1.08 per cent,
Asia Minor opium No. 2.....	1.29 per cent.
Persian opium	1.51 per cent.

According to the process of the author the method of procedure is as follows :

50 Gm. opium are extracted with water as in the U. S. P., 1890, method for the assay of opium, except that, since five times as much material is used, there will also be five times as much aqueous extract. This aqueous extract is then evaporated on the water-bath to a volume of about 250 Cc., 5 Gm. of barium acetate are added, and the solution diluted to about 700 Cc. The barium acetate precipitates the meconic acid and much of the resin. The diluted solution is then filtered, the precipitate thoroughly washed with cold water, and the filtrate and washings are again concentrated, when 5 Gm. barium acetate are added again, and the solution again diluted and filtered. These steps of concentrating, adding barium acetate, diluting and filtering, are repeated until the addition of barium acetate, followed by dilution, produces no further precipitate. The solution is again concentrated and a slight excess of a 10 per cent. solution of caustic soda is added. This causes the thebaine, papaverine and narcotine to be precipitated, while the morphine, codeine and narceine remain in solution. The solution is filtered, the precipitate thoroughly washed with water, the filtrate and washings rendered acid with dilute

hydrochloric acid and concentrated by evaporation on the water-bath. To the concentrated solution 2 per cent. ammonia water is added in excess. This causes the precipitation of most of the morphine, which is filtered off and thoroughly washed. The filtrate and washings are rendered acid with hydrochloric acid and again concentrated. Ammonia water (2 per cent.) is again added in excess, and if any more morphine is present, it will be precipitated. If necessary, filter, wash, acidify with hydrochloric acid and concentrate to about 75 Cc. Then render alkaline with 2 per cent. ammonia water and extract the alkaline aqueous solution with benzene. The benzene will remove the codeine, but not the narcaine. Of course the "shaking out" with benzene must be repeated until 5 Cc. of the benzene evaporated leaves no alkaloidal residue. The benzene is then evaporated and the codeine obtained may be either weighed or titrated. As the residue obtained from the benzene is not crystalline and is colored, it has seemed best to the author to determine the codeine by titration. To the residue is added an excess of $\frac{1}{10}$ sulphuric acid and the excess is determined by means of $\frac{1}{10}$ alkali, cochineal being the indicator used. By this method two determinations have been made on the same sample of powdered Smyrna opium; in one case 1.12 per cent. codeine ($C_{18}H_{21}NO_3 + H_2O$) was found, and in the other 1.33 per cent.

Unfortunately it has not been possible for lack of time to make more determinations, and it is not expected that the method will be accepted on the meagre results here given. Still it is significant and more than a mere coincidence that two experimenters, working on different samples of opium, by different methods, in different countries, should both find more than 1 per cent. of codeine in powdered opium, while manufacturers never succeed in obtaining that much from it on a large scale.

Of course the author does not claim that his method is perfect, nor does he claim that opium does contain more than 1 per cent. of codeine, and that all the present processes used by manufacturers for obtaining codeine from opium are faulty. Nevertheless such a possibility exists, and it will take much more work to either prove or disprove it. It certainly cannot be denied that manufacturers should be able to check their processes on a large scale for obtaining codeine by an assay on a small sample just as they do in the case of morphine. It is intended to continue this work on the assay of opium for codeine, and it is hoped that in the near future more definite results may be announced.

In conclusion it may not be amiss to criticize a little the two methods herein described. In the author's opinion there are two serious objections to Van der Wielen's method. In the first place the amount of material used for the assay is too small. 3 Gm. of opium yield a very small amount of codeine, and it would be very easy to lose some of this en-route during the many steps involved in the method. It seems in-

congruous to use only 3 Gm. of opium in the assay for codeine while for morphine of which there is ten times as much in opium as of codeine, ten grams of opium are usually used. In the second place, Van der Wielen uses an aliquot part of his ethereal solution and the use of aliquot parts, especially where the solvent is such a volatile one as ether, is always to be deprecated. This source of error is magnified in importance when we consider the small amount of opium used in the assay. Now, against the author's method the criticisms may be raised that too much material is used, that the process is too tedious and that there is too much subjection to heat. A large amount of opium must be used to start with because the amount of codeine which it contains is so small, and if a little is lost during the assay it does not form such a large percentage of the whole, as it would if only a small amount were used to start with. That the process is tedious and slow cannot be denied, and yet, if the results are accurate, in place of something better, this objection vanishes. During the assay the alkaloids are subjected to heat for quite a long time, but always in the form of salts, and the temperature does not rise above 100° C. This might be an objection in the case of some of the other opium alkaloids, but in the case of codeine which is known to be a remarkably stable alkaloid, it is held that not much weight can be attached to this criticism.

However, it must be left for future work to decide which of these two methods is the more reliable.

THE USE OF POTASSIUM BI-IODATE FOR STANDARDIZING VOLUMETRIC SOLUTIONS.

BY CHARLES E. CASPARI.

It has been known for many years that potassium bi-iodate offers an excellent ultimate standard for volumetric solutions, but this fact does not seem to be very generally known and seems to be still less used. It is not the object of this paper to present anything new, but simply to give the experience of the author in the use of this new standard, he feeling sure that it deserves more general use than it now enjoys.

In 1860 C. V. Ibau used potassium bi-iodate for standardizing solutions of iodine, that is, he used it to standardize a solution of sodium thiosulphate, from which he standardized his iodine solution. In 1889 the same author published an article showing that even very dilute solutions of potassium bi-iodate can be kept unchanged for years; that they can be used for controlling the titer of solutions of iodine, potassium permanganate and sodium thiosulphate, and that the salt decomposes in the presence of various acids and under different conditions of dilutions according to the following equation :



It was probably this work which caused potassium bi-iodate to be made official in the Hungarian Pharmacopœia.

In 1895 appeared an article by Meinecke in the *Chemiker-Zeitung*, Vol. XIX., page 2, in which he gives the results of many experiments in the use of potassium bi-iodate in standardizing solutions of sodium thiosulphate, iodine, potassium permanganate, silver nitrate and potassium hydrate. The accuracy of his results is marvelous, and we ordinary chemists cannot hope to attain to such accuracy in our analytical manipulations. It was this article of Meinecke's that first drew the attention of the author to this subject and led him to repeat some of the work of Meinecke with the most gratifying results. The results, to be sure, were not as close and accurate as those of Meinecke, nevertheless they justify one in concluding that potassium bi-iodate affords a very excellent standard for all solutions commonly used in volumetric analysis.

This salt can be purchased of a high grade of purity in the market or it can readily be prepared in the laboratory. That which the author used was prepared by himself. Potassium bicarbonate is mixed in solution with an equivalent amount of iodic acid, and if the mixture is neutral, to it is added an amount of iodic acid equal to the amount first used. The solution is evaporated until crystallization begins, and the first crop of crystals is rejected. The crystals which separate after the solution has cooled to 50° C. are almost pure, and will be absolutely pure if recrystallized once from water. Meinecke found as the mean of three determinations that the salt bought in the market contained 100.039 per cent. of potassium bi-iodate. Hence there is no difficulty in procuring a salt which is absolutely pure.

The first experiments made were with weighed portions of the bi-iodate and a solution of sodium thiosulphate, which had been standardized against pure resublimed iodine. The sodium thiosulphate was found to contain 0.024536 Gm. of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ per Cc. as determined by titration against weighed portions of resublimed iodine. The reaction which takes place when potassium bi-iodate reacts with potassium iodide in the presence of an acid is expressed by the equation :

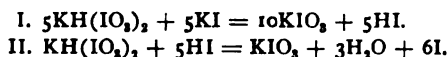


The liberated iodine is then determined with sodium thiosulphate. 388.85 parts of potassium bi-iodate are equivalent to 2971.68 parts of crystallized sodium thiosulphate. The following results were obtained with the solution of sodium thiosulphate described above :

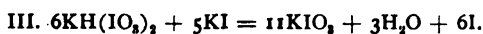
$\text{KH}(\text{IO}_3)_2$	$\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$
I. 0.1996 required 62.19 Cc. = 0.024527 per Cc.	
II. 0.1543 required 48.09 Cc. = 0.024518 per Cc.	
III. 0.1327 required 41.31 Cc. = 0.024549 per Cc.	
Mean 0.024531 per Cc.	

The titer of the same solution determined with iodine was 0.024536

Gm. $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ per Cc. Potassium bi-iodate is also decomposed by potassium iodide in neutral solution, and in this case only $\frac{1}{12}$ of the iodine is liberated as when the decomposition takes place in acid solution. Meinecke claims that the decomposition takes place according to the following equations :



Or combining I and II :



It is thus seen that according to this decomposition one molecule of potassium bi-iodate yields one atom of iodine, and is hence equivalent to one molecule of sodium thiosulphate, while according to the decomposition in acid solution one molecule of the bi-iodate is equivalent to twelve molecules of the thiosulphate. There is one objection to the decomposition in neutral solution, and that is, that in order for the reaction to take place as explained above, the potassium iodide used must be absolutely neutral. It is very difficult to obtain this salt entirely free from alkali, and to remove it requires both time and trouble. Of course a solution of sodium thiosulphate which has been standardized by potassium bi-iodate, may be used to standardize solutions of potassium permanganate, which in acid solutions liberates iodine from potassium iodide, and this iodine can then be determined with the solution of thiosulphate. One molecule of permanganate liberates five atoms of iodine, and is hence equivalent to five molecules of sodium thiosulphate. Solutions of potassium permanganate standardized by oxalic acid and by sodium thiosulphate, which in turn had been standardized through potassium bi-iodate, gave results which agreed with each other to within 0.1 of one per cent.

A solution of silver nitrate may also be standardized by means of potassium bi-iodate. It is well known that iodic acid and its salts are easily reduced by sulphurous acid or sulphites with the liberation first of iodine, and with the further addition of the reducing agent, the formation of hydriodic acid or iodides. The reaction takes place so smoothly that the reduction can be effected with a minimum excess of the reducing agent, and this slight excess can be easily removed by heating the solution for a short time with a little nitric acid, thus oxidizing the sulphite to sulphate. The hydriodic acid or iodide formed can be precipitated as silver iodide with an excess of silver nitrate, and the excess determined by means of a solution of potassium sulphocyanide. One molecule of potassium bi-iodate is equivalent to two molecules of silver nitrate. This method of standardizing a solution of silver nitrate was tried by the author with the following results : A solution of silver nitrate was prepared and standardized against pure sodium chloride by the Volhard method, and the solution was

found to contain 0.016827 Gm. of silver nitrate per Cc. Then weighed portions of potassium bi-iodate were reduced with sulphurous acid, the excess of sulphurous acid oxidized by means of nitric acid, and the amount of silver nitrate necessary to precipitate all the iodine as silver iodide was determined by Volhard's method. The results follow :

KH(IO ₃),	AgNO ₃
0.8671 required 44.99 Cc. =	0.016808 Gm. per Cc.
0.7524 required 39.02 Cc. =	0.016815 Gm. per Cc.
0.9356 required 48.55 Cc. =	0.016804 Gm. per Cc.

Mean = 0.016809 Gm. per Cc.

The titer of the same solution as determined by titration against sodium chloride was found to be 0.016827 Gm. per Cc.

Finally, the strength of standard solutions of alkalies may be determined by means of potassium bi-iodate, which is an acid salt, phenolphthalein being the indicator used. The author made use of a solution of potassium hydroxide, whose strength had been accurately determined by means of oxalic acid. In this way the solution was found to contain 0.005487 Gm. of potassium hydroxide per Cc. One molecule of the bi-iodate is equivalent to one molecule of potassium hydroxide, or 388.85 parts of the bi-iodate are equivalent to 55.99 parts of potassium hydroxide. Weighed portions of the bi-iodate were dissolved in water and titrated with the solution of potassium hydroxide, using phenolphthalein as an indicator. The results follow :

KH(IO ₃),	KOH
1.8723 required 49.18 Cc. =	0.005482 Gm. per Cc.
1.8946 required 49.80 Cc. =	0.005478 Gm. per Cc.
1.7392 required 45.67 Cc. =	0.005483 Gm. per Cc.

Mean = 0.005481 Gm. per Cc.

The titer of the same solution of potassium hydroxide found by means of oxalic acid was 0.005487 Gm. per Cc.

The results recorded in this paper seem to show conclusively that potassium bi-iodate is particularly well adapted for standardizing solutions of sodium thiosulphate, and through it solutions of iodine and potassium permanganate, of silver nitrate, of the alkalies and through them of the acids. The results obtained by Meinecke agree much more closely than those of the author, but still those recorded here are very satisfactory.

It will be noticed that considering tenth-normal solutions in standardizing solutions of sodium thiosulphate and silver nitrate, relatively small amounts of potassium bi-iodate are required by 50 Cc. of solution, while in the case of potassium hydroxide a large amount is required for 50 Cc. of solution and hence in the former case a small error in weighing off the

the bi-iodate would entail a relatively large error in the results. For this reason it is best to use the potassium bi-iodate in the form of a solution of known strength, say tenth-normal, when the difficulty will be obviated. It has been tried and found that solutions of potassium bi-iodate which have been preserved for two years in tightly-stoppered bottles have lost only 0.04 per cent. in strength.

This salt then can be used for standardizing all the volumetric solutions commonly found in a laboratory, and these in turn can be checked against each other, thus proving them to be correct. It does away with the necessity of preparing resublimed, dry iodine, c. p. oxalic acid of the composition $C_2H_2O_4 \cdot 2H_2O$ and with the method of standardizing potassium permanganate by means of iron wire. Further advantages in the use of potassium bi-iodate are that it is easily procured in an absolutely pure state, it contains no water of crystallization and is neither deliquescent nor efflorescent, and it can be thoroughly dried at $110^\circ C.$ without fear of decomposition.

In view of these numerous advantages, it seems strange that the salt does not enjoy more general use, unless it be because chemists in general are not familiar with it. On this account only has this paper been presented, and it is hoped that those who are interested will give it a trial as opportunity offers. The author will be only too glad to discuss any points in detail with those who desire to make a trial of the salt.

The papers were received, to take the usual course.

Mr. Mayo read in abstract the following paper on the testing of clinical thermometers, first exhibiting a picture of the table in the Bureau of Standards in Washington containing apparatus for testing the correctness of such thermometers.

INACCURACY IN CLINICAL THERMOMETERS.

BY CASWELL A. MAYO, PH. G., NEW YORK.

Having had an opportunity some months ago to observe the methods used in the manufacture of clinical thermometers, I was impressed by the importance of accuracy in these instruments. With a view of determining the reliability of the thermometers on the market, I purchased eleven lots of one-half dozen each in six different cities. Each of these lots bore different marks, but all were of a grade sold by jobbers at \$6.00 to \$7.00 per dozen, and fairly represented the average grade of thermometers purchased by pharmacists for sale over the counter. All were provided with certificates purporting to be from the manufacturers. Having collected these thermometers, I submitted them to the United States Bureau of Standards for examination.

Where thermometers vary more than three-tenths of a degree from the standard thermometers of the Bureau, they are rejected. Thermometers are also rejected which fail to repeat within three-twentieths of a degree in

two readings at the same point. The results of the examination of this lot of 62 thermometers (the remainder being broken in transit) are shown in the tabulated statement attached to this paper. These results may be summarized as follows:

Lot A. 2 out of 6 rejected.
 Lot B. 1 out of 6 rejected.
 Lot C. 5 out of 6 rejected.
 Lot D. 0 out of 5 rejected.
 Lot E. 1 out of 6 rejected.
 Lot F. 2 out of 6 rejected.
 Lot G. 1 out of 6 rejected.
 Lot H. 1 out of 6 rejected.
 Lot I. 3 out of 4 rejected.
 Lot J. 2 out of 5 rejected.
 Lot K. 0 out of 6 rejected.

REPORT OF UNITED STATES BUREAU OF STANDARDS ON SIXTY-SIX CLINICAL THERMOMETERS SUBMITTED BY CASWELL A. MAYO.

Nos.	Corrections at.				Remarks.	Nos.	Corrections at.				Remarks.
A	96°	100°	104°	108°		B	98°	100°	104°	108°	
1	-0.3	-0.4	-0.4	-0.4	Reject.	1	-0.2	-0.2	-0.3	0.0	
2	0.0	0.0	0.0	0.0		2	-0.2	-0.3	-0.3	-0.3	Reject.
3	-0.4	-0.4	-0.5	-0.4	Reject.	3	-0.2	-0.2	-0.1	-0.1	
4	-0.1	-0.2	-0.1	0.0		4	-0.2	-0.3	-0.2	-0.2	
5	-0.2	-0.2	-0.2	-0.1		5	-0.1	0.0	-0.1	0.0	
6	-0.3	-0.2	-0.2	-0.1		6	Broken when received.				
C						D					
1	0.0	-0.1	-0.1	-0.2		1	-0.2	-0.1	0.0	0.0	
2	-0.5	-0.4	-0.4	-0.4	Reject.	2	-0.2	-0.1	-0.1	-0.1	
3	-0.5	-0.6	-0.6	-0.6	Reject.	3	-0.1	-0.2	0.0	-0.2	
4	-0.5	-0.6	-0.5	-0.5	Reject.	4	-0.2	-0.1	-0.2	-0.1	
5	-0.4	-0.4	-0.4	-0.4	Reject.	5	-0.1	-0.1	-0.1	-0.1	
6	-0.3	-0.1	-0.1	-0.4	Reject.	6	-0.1	-0.1	Broken.		
E						F					
1	-0.4	-0.3	-0.2	-0.2	Reject.	1	-0.3	-0.2	-0.1	-0.1	
2	0.0	0.0	0.0	-0.1		2	-0.3	-0.2	-0.2	0.0	
3	-0.1	-0.1	-0.2	-0.3		3	-0.2	-0.3	-0.1	0.0	
4	-0.2	-0.3	-0.2	-0.2		4	-0.4	-0.2	-0.1	0.0	Reject.
5	-0.1	-0.2	-0.2	-0.2		5	-0.4	-0.3	-0.1	0.0	Reject.
6	-0.3	-0.3	-0.3	-0.2		6	-0.2	-0.3	-0.1	-0.2	
G						H					
1	0.0	0.0	-0.1	-0.1		1	-0.2	-0.3	-0.2	-0.1	
2	-0.1	-0.2	-0.2	-0.2		2	-0.1	-0.2	-0.3	-0.4	Reject.
3	-0.1	-0.2	-0.2	-0.2	Reject.	3	0.0	0.0	-0.1	-0.1	
4	-0.2	-0.2	-0.2	-0.2		4	0.0	-0.1	-0.1	-0.1	
5	0.0	-0.1	-0.1	-0.2		5	0.0	0.0	0.0	0.1	
6	-0.2	-0.2	-0.2	-0.1		6	-0.2	-0.1	-0.0	0.0	

I					
1	-0.3	-0.4	-0.4	-0.4	Reject.
2	-0.2	-0.3	-0.3	-0.4	Reject.
3	-0.4	-0.6	-0.6	-0.5	Reject.
4	0.0	-0.2	-0.1	0.0	
5	Broken when received.				
6	Broken when received.				

J					
1	0.0	0.0	0.0	0.0	
2	+ .1	+ .1	0.0	0.0	
3	- .2	- .2	0.0	+ .1	
4	- .4	- .4	- .3	- .4	Reject.
5	0.0	0.0	0.0	- .3	Reject.
6	Broken when received.				

K					
1	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	
3	+ .1	+ .1	+ .1	+ .1	
4	+ .1	+ .1	+ .1	+ .1	
5	+ .1	+ .1	0.0	0.0	
6	0.0	0.0	0.0	+ .1	

This shows that 29 per cent. of the thermometers bought were not sufficiently accurate to meet the requirements of the Bureau of Standards. Only 11 per cent. of all the clinical thermometers examined by the Bureau during last year were rejected. It would appear, therefore, that manufacturers exercise greater care with the thermometers which they submit to the Bureau of Standards for certificates than with those found in the open market.

A careful analysis of the results of this investigation brings to light several interesting facts. In the first place, there are only about a *dozen* manufacturers of clinical thermometers, and of these only about *five* really make their own thermometers. The others buy the ungraduated tubes, graduate them, put their own marks on them, and send them out as if they were their own make. The majority of the thermometers sold are made by two or three manufacturers, who put on them any desired brand or mark, and in this way probably a thousand apparently different makes are found on the market. It is hardly necessary to state that where the real maker's name does not appear, the maker is apt to be careless. For instance, one of the lots examined, though bearing a small dealer's name, was made by one of the large makers whose certificates are usually to be relied upon, but of this lot, five out of six were rejected. There is one so-called manufacturer who makes a practice of buying up the rejected "tubes," as the ungraduated thermometers are termed, graduating them, and selling them a little below the market price. It is hardly necessary to say that such thermometers are worse than useless.

The positive criminality of the manufacturers in selling clinical thermometers which are so misleading in their results, as are some of those examined, must be apparent to anyone who has observed the grave importance which attaches to the variations in temperature in many febrile diseases. The mere fact that the pharmacist is not in position to carry out the testing of thermometers in his own store by no means acquits him

of responsibility in the matter. He can have his thermometers tested by the government at a very slight expense.

HOW TO SECURE GOVERNMENT CERTIFICATES.

All that is necessary is to pack half a dozen thermometers carefully, and express them prepaid to the United States Bureau of Standards, Washington, D. C., putting the name and address of the shipper on the package, and enclosing \$1.00 in money or Post Office money-order (checks not being accepted) to cover cost of certification. The thermometers will be tested and returned within ten days or two weeks, each being accompanied by a government certificate which will not only enable the pharmacist to learn the actual facts as to the accuracy of his thermometers, but will increase the market value of those which stand the test sufficiently to make the investment a profitable one. It has been suggested that the pharmacist should test his own thermometers by comparing them with what he believes to be accurate thermometers plunged into a teacup of water. The absurdity of this procedure becomes quickly apparent when one considers the various sources of the possible error involved in such a rough-and-ready method.

AGING THERMOMETERS.

Experiments made by the Bureau of Standards have demonstrated that where ordinary domestic glass is used in making all parts of the thermometer, the average increase in the reading at the end of two months is three-tenths of a degree, and at the end of fourteen months sixty-eight-one-hundredths of a degree. The average change, however, in thermometers made with what is known as Jena normal glass or with French hard glass, at the end of two months amounts to only six one-hundredths of a degree, and at the end of fourteen months eleven one-hundredths of a degree, showing that with this glass one-half the total observed change takes place during the first two months, and as a matter of fact the changes which occur after three or four months are practically negligible. These changes in the reading of thermometers are due to the fact that when glass is heated it expands quite rapidly to the volume corresponding to the temperature to which it is heated, but upon being cooled to the initial temperature, it does not resume its initial volume for some time, the length of time elapsing depending upon the character of the glass and the amount of change in temperature. The gradual contraction of the glass to its initial volume results in a diminution in the size of the bulb, and consequently the mercury is caused to rise higher in the tube and give a higher reading after the thermometer has stood for some time than when it is first completed. Since the volume of mercury contained in the stem is very minute, the change in the volume of the stem may be disregarded, and as a consequence it has become customary in the United

States to make the stem of soft glass, using hard glass for the bulbs only. It occasionally happens also that in recovering from the stress caused by the great heat used in making the contraction of the bore which makes the thermometer self-registering, a small splinter of glass is thrown off in the tube. This is not apt to take place until some time after the thermometer is made, but if it does occur, it of course vitiates the readings of the thermometer.

Taking all these facts into consideration, it will be seen that it is highly important to "age" thermometers before they are put into use, and this point is fully appreciated by careful makers who always "age" their thermometers before graduating them.

THE EXAMINATION OF THERMOMETERS BY THE BUREAU OF STANDARDS.

The United States Bureau of Standards above referred to is a Bureau of the Department of Commerce and Labor and is authorized to establish and to examine standards for the determination of electrical units, units of capacity, of mass, of length, and to standardize thermometers and scientific instruments generally. Up to the time that this Bureau was established in 1901, the standards of the Yale Observatory were generally accepted. It has been found, however, that the Yale standard thermometers are slightly at variance with what is known as the International Hydrogen Scale based upon the researches of Chappuis carried out at the International Bureau of Weights and Measures. This scale is defined as follows in a resolution of the International Committee on Weights and Measures, adopted October 15, 1887:

The International Committee on Weights and Measures adopts as the standard thermometric scale for the International "Service of Weights and Measures," the centigrade scale of the hydrogen thermometer, having as fixed points the temperature of melting ice (0 degrees) and of the vapor of distilled water boiling (100 degrees) at standard atmospheric pressure; the hydrogen being taken at an initial manometric pressure of 1 meter of mercury; that is to say, $1000/760 = 1.358$ times the standard atmospheric pressure.

On this scale of temperature therefore, one degree is measured by $\frac{1}{100}$ of the change of the pressure between the two fixed points, of a confined mass of hydrogen gas whose volume is kept constant, and whose initial pressure (at 0° C.) is equivalent to 1 meter of mercury (at 0° C., and at sea level, latitude 45 degrees).

It is hardly necessary to say that this scale is not capable of immediate application in the testing of clinical thermometers, and for that reason clinical standard thermometers have been constructed by the Bureau of Standards, being so made that when used in the water-bath for testing, the stems project above the surface only about two and a half inches, and hence the variation of the temperature in the room may be neglected. The corrections for these clinical standards are carefully determined by comparing them with the primary standards of the Bureau.

DETAILS OF THE METHODS.

The routine pursued by the Bureau in carrying on the work of standardization of clinical thermometers may be outlined briefly as follows: On each of the thermometers there is engraved a mark of identification for the use of the Bureau. The thermometer is then examined for defects of construction, such as the presence of air bubbles, or moisture in the mercury or in the bore, cracks in the glass and defective graduations.

If this test is satisfactory, the thermometer is then compared with the standard thermometers of the Bureau at the four test points, 96, 100, 104 and 108 degrees, two independent comparisons being made at each point. If the two tests at any point differ by more than 0.15 degree F., or if the mean of the two tests gives a correction in excess of 0.3 degree F., the thermometer is rejected. Furthermore, errors in the intervals between test points must not exceed 0.3 degree F. For example, if the correction at 96 degrees is 0.3 degree and at 100 degrees 0.1, the error in the interval would be 0.4 degree F., and the thermometer would be rejected.

Twenty-four thermometers are mounted in one of the small holders shown in Fig. 1. The loaded holder is placed in a tank of water heated

FIG. 1.

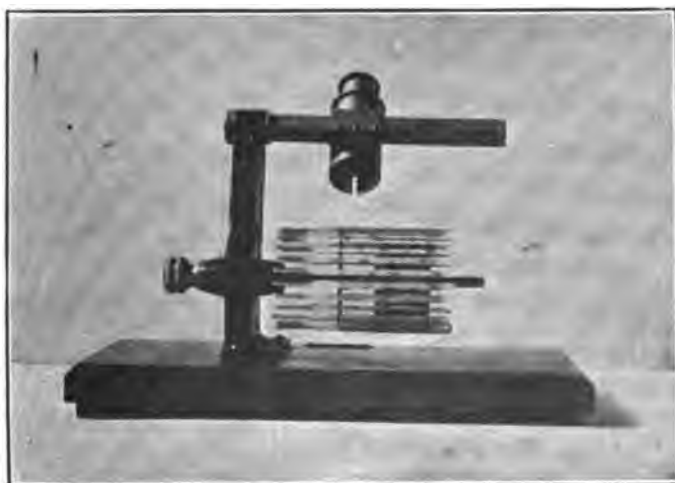
**Holder Loaded with 24 Thermometers.**

to a temperature of 96 degrees. The tank used by the Bureau of Standards is quite intricate in construction, heated by an electrical coil, and is so designed as to insure the retention of the water at any temperature that is desired. This tank appears in the center of the table in Fig. 2, which shows a complete set of the apparatus used for testing clinical thermome-

FIG. 2.

**Complete Set of Apparatus for Examining Clinical Thermometers.**

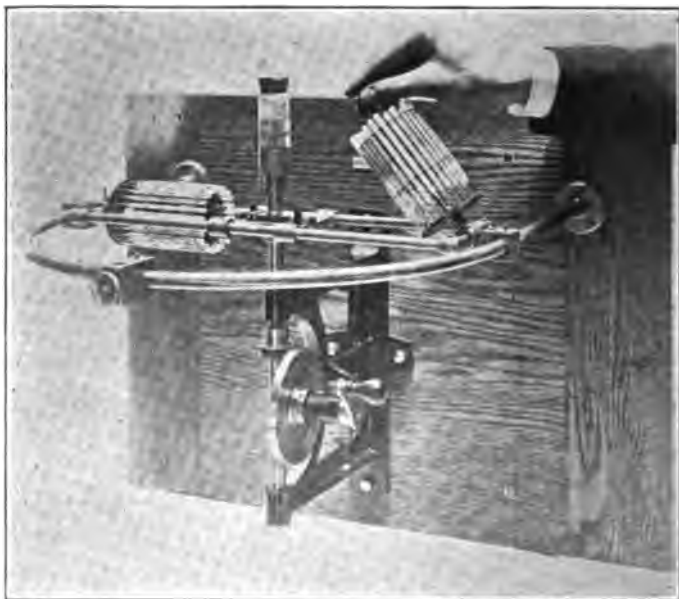
FIG. 3.

**Holder in Observation Stand, with Micrometer Eye-Piece.**

ters in the Bureau of Standards. This table, by the way, forms a portion of the exhibit of the Bureau of Standards in the Government Building at the St. Louis Exposition. The holder is then taken out and placed on the stand shown in Fig. 3, to which is affixed a micrometer eye-piece. Reading through this eye-piece the location of the index is very accurately and rapidly noted, an assistant taking down the figures called out by the observer.

The loaded holder is then placed in a centrifugal machine, or whirling device, which is shown in Fig. 4. By a series of experiments the Bureau

FIG. 4.



Centrifugal Machine for Throwing Back the Index.

has determined the rate of speed at which this apparatus should be turned in order to equal the average force exerted in "shaking down" or resetting the index of the thermometers, and if the index fails to return when the machine is turned at the indicated speed, showing that the index is too difficult to shake down, the thermometers are rejected.

The holder is again placed in the water-bath and a reading taken at 100 degrees, the results noted, the index shaken down by means of the whirling device, and observations made at 104 degrees, and finally at 108 degrees. This process is repeated, so as to give two readings for each thermometer at the same temperature. A careful comparison of these readings enables the operator to formulate a certificate for such of the

thermometers as are acceptable and to determine which should be rejected. The results of these examinations are furnished to the maker or dealer, who submits the thermometers, in a tabulated form, so that they can always be referred to when necessary. A reduced fac-simile of such a tabulated statement is presented in Fig. 5.

FIG. 5.

Department of Commerce and Labor
BUREAU OF STANDARDS
Washington

The following form
is to be filled out by the
Bureau of Standards

B. S. TEST NO. 988 of 24 CLINICAL THERMOMETERS

Submitted by Clinical Mfg Co. Marked The F. J. H. Drug Co.

Observed by H. H. and F. W.

Computed by F. W.

Checked by H. D. Holder No. 10 Date 4/22/04.

Reading Therm	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
No. 18726	-0.5 -0.5	-0.5 -0.5	-0.5 -0.5	0 0
Green Therm	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
No. 18729	0.01 0.01	0 0	-0.01 -0.01	-0.01 -0.01
Cor. Temp	96.00 96.00	100.00 100.00	104.00 104.00	108.00 108.00
1	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
2	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
3	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
4	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
5	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
6	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
7	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
8	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
9	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
10	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
11	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
12	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
13	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
14	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
15	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
16	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
17	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
18	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
19	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
20	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
21	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
22	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
23	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05
24	96.00 96.05	100.00 100.05	104.00 104.05	108.00 108.05

Specimen Fast Record Sheet, as Furnished by the United States
Bureau of Standards.

For much of the information contained in the above note, and for the illustrations, I am indebted to Mr. S. W. Stratton, Chief of the Bureau of Standards, who has kindly permitted me to make free use of all advance sheets of a monograph describing the work of the Bureau, written by L. A. Fischer and C. W. Waidner. I am also indebted to several of the manu-

facturers of clinical thermometers who are interested in the elevation of the character of the thermometers on the market.

Having had so much to say in criticism of the commercial thermometers, it is but justice to the manufacturers to state that some of them have displayed the keenest interest in my work, and have given me every assistance and encouragement in my effort to bring about a betterment in the character of the clinical thermometers on the market. The need of greater care in the purchase of clinical thermometers having been pointed out to pharmacists and physicians, it is to be hoped that an improvement will take place in the character of these goods as generally found in the market.

Mr. Wilbert stated the experience at the German Hospital, in Philadelphia, in having 25 or 30 per cent. of their thermometers sent for testing returned as not complying with the standard. He said they had found the manufacturers' certificates very unsatisfactory.

Mr. Mayo gave some additional details of the heavy percentage of the ordinary domestic thermometers found not to conform to the requirements, and told of how certain manufacturers sell in bunches their own "tubes," as they call them—thermometers that cannot stand their own examination—to a particular man who has a large trade in them and makes no effort to grade them, but sells them for almost anything he can get.

Mr. Hynson said in his establishment they used the European standard thermometer, and considered it accurate. He thought either the Hicks or Taylor was a good thermometer. They had had thermometers offered them as low as three dollars a dozen. Mr. Wilbert suggested eighteen dollars a gross.

Mr. Kebler told of an experience the Bureau of Chemistry had had with some chemical thermometers, supposed to be of the highest grade. They were suspected because they did not agree with an ordinary thermometer that he had used himself, and upon being tested at the Bureau of Standards they were found to be out from a quarter of a degree to two whole degrees, thereby demonstrating that they were absolutely worthless for the work intended.

The paper was received and referred.

Mr. Hynson then read in abstract the following paper on Saponin as an Emulsifying Agent :

SAPONIN AS AN EMULSIFYING AGENT.

BY N. G. KEIRLE, JR., M. D. AND H. A. B. DUNNING, PH. G.

If it should be asked why this subject is presented for the consideration of the more scientific devotees of pharmacy or why, at all, answer could be made as follows :

1. In spite of all the work done upon emulsions and all that has been written about them, satisfactory conclusions have not been reached.

2. Largely due to their education by the manufacturers of the more popular emulsions, physicians, especially, are prone to value these products by their appearance; they must not separate, should be white and fluid enough to pour easily from the bottle.

3. Expensive and hard-to-cleanse apparatus for small quantities and varying extemporaneous work is impracticable for the dispenser, even if these devices would overcome or partly overcome these difficulties.

4. The conscientious pharmacist desires to present an emulsion equal to any other in appearance, one that is digestible, that will not ferment and that does not contain such preservatives as will interfere with the activity of the digestive fluids.

5. Saponin, if not objectionable on account of its toxic or pharmacologic properties, offers the means with which all the enumerated difficulties may be overcome. With no more than one grain of this substance and a very small quantity, twenty-four grains, of tragacanth, a pint of fifty per cent. emulsion of cod-liver oil may be quickly made in a mortar. It will not separate, will not ferment, is not too thick and, withal, is white and smooth. One grain of saponin and twenty-four grains of tragacanth compared, in cost, with two ounces of acacia, is as $\frac{1}{2}$ is to 5.

The object and scope of this paper must not be misunderstood. It will attempt to show the physical value of saponin and strive to throw additional light upon its toxic and pharmacologic properties. In all this, it will go no farther than to report what has been done in an effort to satisfactorily settle a matter of much practical value to those who inaugurated it. Incidentally, it will recount the effort made to ascertain if saponin is used in the emulsions so generally marketed. It does not pretend to be complete nor to treat the subject near so well or so fully as have Kuhler, Kobert and others. These have, as is known, done a great deal of creditable work, yet, in all, have not answered the questions:

Is saponin a safe emulsifying agent? and, if not toxic in the quantities necessary, are its pharmacologic effects of sufficient importance to make it necessary for a physician to know of its presence in a preparation he is prescribing?

Believing the effects of the substance upon the usual trial animals would throw some light upon its action, when taken in emulsions, experiments were made by one of us (N. G. K., Jr.) at the Pasteur Department, College of Physicians and Surgeons, Baltimore, where large numbers of these animals are used.

Rabbits, dogs and guinea pigs were successively treated with saponin by hypodermic injection and by stomach. The work was carefully checked by injecting a similar animal with same syringe, sterilized, as for saponin, but using sterile water, instead of solution. Nine rabbits in all were treated; five, hypodermically, with doses of $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 3 grains, respectively, and four were given by mouth, $\frac{1}{2}$, 1, 2, 3 grains, respectively.

But one of the rabbits died ; this one had but one grain by mouth and, no doubt, died from other causes, which, however, may have been aggravated by the saponin. All, first, became excited, then dull, and showed irregular, if not always rapid, breathing. Those observing the rabbits would at once conclude that the substance had a marked effect upon their respiratory organs ; yet, as would seem from trials upon dogs and guinea pigs, rabbits are comparatively immune to its toxic effects.

Saponin was tried upon dogs with the idea of ascertaining whether or not it would kill them, and four grains were injected into an animal weighing eighteen pounds. The dog died during the night, after getting the dose at about twelve noon the day before ; two other dogs, receiving four grains each, died in about the same time and with similar symptoms—slow, deep respiration, dullness in stomachs and excessive flow of saliva. Post-mortem examinations showed about the same conditions in all ; œdematous conditions prevailed in all instances in brain, and dry thoracic walls. The lungs were peculiarly anæmic and toughened ; kidneys hyperæmic ; stomachs and bladders empty.

Five guinea pigs were injected with 2, 1, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ grains successively ; all died about four or five hours after receiving the dose, and showing the same œdematous state and the peculiar lung condition that was so noticeable in the dogs : collapsed and anæmic. The degree of these conditions was in proportion, however, to the size of dose.

Details of all experiments on animals follow by Dr. Keirle :

Rabbit No. 1. Injected, Saponin, gr. $\frac{1}{4}$, April 22, 1904.

- 2.40 p. m. Immediately afterwards began eating, but soon stopped.
- 3.00 p. m. Nervous, and seemed excited or annoyed.
- 3.05 p. m. Began to shake slightly from side to side and to breathe rapidly.
- 3.07 p. m. Urinated.
- 3.10 p. m. After continuing to run about pen in an excited way, sat in corner and seemed dull. Breathing not so quick.
- 3.15 p. m. Ate cabbage for a few bites.
- 3.20 p. m. Quiet and more natural.
- 4.00 p. m. OK.
- 6.00 p. m. OK.
- April 23, 8 a. m. OK.

Rabbit No. 2. Injected, Saponin, gr. $\frac{1}{2}$, April 23, 1904.

- 1.40 p. m. Ate, when replaced in the pen.
- 1.44 p. m. Still eating.
- 1.45 p. m. Stopped eating.
- 1.50 p. m. Dull and stupid ; moved slowly, when forced to do so.
- 1.55 p. m. Restless and somewhat excited, breathing quickly.
- 2.05 p. m. Very quiet.
- 2.12 p. m. Quiet.
- 2.17 p. m. Eating.
- 2.19 p. m. Eating.
- 2.26 p. m. Eating.
- 2.58 p. m. Temperature, 103 $\frac{1}{2}$ (about normal).

Rabbit No. 3. Injected, Saponin, gr. 1, 1.45 p. m.

- 1.50 p. m. Eating.
- 1.55 p. m. Breathing rapidly.
- 2.03 p. m. Very dull and quiet.
- 2.06 p. m. Rapid breathing.
- 2.12 p. m. Still quite dull.
- 2.17 p. m. Refused food.
- 2.19 p. m. Dull, refused food.
- 2.26 p. m. Dull, refused food.
- 2.50 p. m. Temperature, 103 $\frac{1}{2}$.

Rabbit No. 4. Injected, Saponin, grs. 2.

- 1.50 p. m. Ate when placed in box, and continued to do so until 1.55.
- 2.00 p. m. Quiet.
- 2.03 p. m. Very still and quiet, breathing irregularly, slowing, then very rapidly.
- 2.12 p. m. Dull and stupid. Slow on forced movement. Respiration slow. Continued very dull and stupid, refusing food and water, shaking slightly from side to side, and breathing irregularly until 2.26.
- 2.26 p. m. Nibbled a little food, but stopped at once.
- 2.44 p. m. Temperature, 103 $\frac{1}{2}$.

Rabbit No. 5. Injected, Saponin, gr. 3.

- 1.59 p. m.
- 2.00 p. m. Much excited when put in box.
- 2.04 p. m. Much excited and seems worried.
- 2.06 p. m. Became quiet and dull, and breathed very rapidly,
- 2.12 p. m. Dull, but ran around better than all the others, when forced.
- 2.15 p. m. Quiet, very rapid breathing, and marked shaking from side to side. Seemed nervous and started at the least touch.
- 2.19 p. m. Refused food.
- 2.26 p. m. Quiet, but not so stupid. Still shakes. Breathes slowly, then rapidly. Refuses food.

Rabbit No. 6. By Stomach, Saponin, gr. $\frac{1}{2}$.

- 12.52 p. m. Absolutely no effect. Quiet, but seemed very well, and ran about rapidly when touched with a stick.
 - 1.20 p. m. Fed and ate at once.
 - 2.00 p. m. Had not vomited. Well, and seemed all right.
- (All these were well the next morning.)

Rabbit No. 7. By Stomach, Saponin, gr. 1.

It was afterwards discovered that this rabbit had aborted the night before.

- 1.04 p. m. Gr. 1, by mouth; very quiet and dull.
- 1.20 p. m. Fed, but would not eat.
- 1.45 p. m. Had a fit in which it died. (Note—Fully accounted for by abortion.)

Rabbit No. 8. By Mouth, Saponin, gr. 2.

- 1.10 p. m. Saponin, gr. 2. Quiet when put in pen, but did not seem distressed.
- 1.20 p. m. Fed and ate at once. Respiration somewhat irregular, but no other symptom.

Rabbit No. 9. By Mouth, Saponin, gr. 3.

- 1.15 p. m. Very quiet, and seemed excited when put in pen.
- 1.20 p. m. Refused food.

1.25 p. m. Respiration very quick, animal dull and moves slowly and unwillingly when touched.

1.35 p. m. Quiet and dull, but seemed better.

1.40 p. m. Ate a little.

1.50 p. m. Ran about cage in a normal manner. Breathes quiet, but a little irregularly.

(Note—All treated by the stomach were watched for an hour, and none vomited.)

Black and Tan Dog. Weight, 18 lbs.; injected Saponin, 4½ gr., May 2, '04.

12.25 p. m.

12.40 p. m. Dull and dazed, slow and deep respiration.

12.47 p. m. Brighter, not so dull. Trembling limbs; urinated.

1.00 p. m. No change.

1.12 p. m. Dull and quiet, but rather better.

1.55 p. m. Temperature elevated a little, 1 per cent. F.; will not eat.

2.00 p. m. Quiet but dull. Breathes irregularly.

May 3rd.

12.00 p. m. Dull all night and day. At first refused food, then ate, but vomited in a few minutes. Looks very sick, with low, deep respiration, and then rapid.

5.00 p. m. May 4th. Dead.

P. M. May 4th. Rigor Mortis Plus. Lungs collapsed in thorax. Right lung pale, and feels tough and peculiar. Left lung tough but not pale, due to gravitation of blood. (Dog lay on left side.) Crepitus very little in either. Bladder empty. Stomach empty, except for a little water. Kidneys red and hyperæmic. Brain oedematous.

Dog No. 2. Injected, Saponin, grs. 4; weight 14 lbs.

1.17 p. m. Very lively.

1.45 p. m. Little dull, hind legs trembling.

2.10 p. m. Very sick, saliva running from mouth, sitting down, won't eat.

6.20 p. m. May 13th, found dead.

Post mortem, June 13, 1904, 6.50 p. m. Rigor mortis plus. Mouth filled with bile, brain oedematous. Lungs: Oedema of right side of thorax and a little blood in muscle of left side at needle puncture. Both lungs pale and collapsed, especially upper lobes. Also very anaemic. Stomach empty of food, full of bile.

Note: Condition of lungs, especially, corresponds with that found in dog No. 1, and both guinea pigs, Nos. 1 and 2.

Guinea Pig. Injected, Saponin, gr. 2.

Found dead, 5 p. m., May 12th. (Weight 7 ozs.)

Post mortem, 6.35 p. m. Rigor mortis marked. Lungs very pale and collapsed, little crepitus, but floated. Brain oedema, bladder empty.

Note: Same state found in lungs as was in lungs of dog. No. 1.

Guinea Pig, No. 2. Injected, Saponin, gr. 1; weight, 7 ozs.

5.00 p. m. Dying.

5.20 p. m. Dead.

5.50 p. m. Post mortem. Rigor mortis slight. Lungs: Upper half of both lungs pale and collapsed, especially so in left. Float: Balance same as in other pig but less marked.

Note: Similar condition found in both pigs and dog. (Lungs showed state of anaemia in all.)

Guinea Pig, No. 3, gr. ½.

Died afternoon of the injection.

Guinea Pig, No. 4, gr. $\frac{1}{4}$, and Guinea Pig, No. 5, gr. $\frac{1}{8}$.

Both died during night of injection.

Post mortem. Showed same pathological changes as in all others but to a lesser degree, according to a larger or smaller dose.

Check: Against question of injection. A very small guinea pig of about one-half the size of those used for these experiments was injected, using 2 Cc. of pure water (being a little over the same amount of fluid used in the experiments) with the same needles, syringe, glasses, etc., and injection had no effect.

Guinea Pigs, Nos. 4, 5, 6. Injection with Saponin, $\frac{1}{8}$ gr., $\frac{1}{16}$ gr., $\frac{1}{32}$ gr., respectively.

Gr. $\frac{1}{8}$ and $\frac{1}{16}$ died in about forty-six hours, after being sick and then getting much better.

In all cases, whether dogs or pigs, the post-mortem changes were identical, varying only according to dose: the larger doses causing more pronounced changes over greater areas than the smaller.

Brain: Oedematous and a slight hyperæmia.

Lungs: Areas; from entire lung to part of a lobe (according to dose) pale and anæmic. Collapsed in thorax. No crepitus in the affected areas, but they will float, showing presence of air. Feel tough and like leather. In lungs in which only a part is affected, this part is in the upper lobe.

Kidneys: Hyperæmic. The bladder is empty or almost, so showing a suppression of urine.

Stomach: Empty, except in one or two cases for a little water.

In some cases the walls of the thorax and abdomen were oedematous. Rigor mortis comes on early and is always well marked.

The other organs show nothing of note.

Conclusion: Parts affected are especially the lungs and then the kidneys. While the stomach is empty of food, it contains water and shows no change.

It is to be gathered from all this that saponin is *toxic*, and tends specially to deplete the lungs and to render the lung tissue less flexible, thereby preventing the rapid circulation of blood through them. As this substance would be generally administered, when the lungs were already impaired, it would seem important to know if the quantity used was at all sufficient to produce untoward results.

With a desire to ascertain whether or not saponin is used in marketed emulsions, which have many of the desired qualities, several examinations were made, but nothing to indicate the presence of saponin or its probable source, quillaya, was discovered.

EXPERIMENTS OF MR. DUNNING.

Two samples of emulsion of cod-liver oil with hypophosphites were prepared, one sample containing saponin, while the other was free from that substance.

In each case, one hundred Cc. of the emulsion, contained in a flask, was diluted with 100 Cc. alcohol and heated on a water-bath, thereby "breaking" the emulsion. The alcoholic solution was then separated from the oily mass by filtration and evaporated until alcohol was driven off, when the mixture was filtered and again evaporated nearly to dryness. The residue was then extracted with 50 Cc. of a boiling mixture of equal parts of alcohol and chloroform, this solution was filtered while hot and evaporated to dryness, when the residue was extracted with 50 Cc. of boiling mixture of alcohol 25 per cent., and chloroform 75 per cent. This solution was evaporated to dryness and the residue taken up with water.

An aqueous solution of the residue obtained from the emulsion made with saponin gave, upon shaking, the characteristic foam of saponin solutions, distinguished by whiteness and comparative permanence.

A solution of the other residue, when shaken, did not give a similar foam.

It was learned that a slightly colored concentrated sulphuric acid solution of potassium dichromate would turn green upon the addition of a drop of very dilute solution of saponin, and that sulphuric acid, containing a drop of $\frac{K}{10}$ potassium permanganate (the solution being of a brownish tinge), would become cherry-red upon the addition of a drop of saponin solution. Further, it was ascertained that a saponin solution containing oxidizable matter like the hypophosphites, after being treated with potassium permanganate solution and sulphuric acid, until oxidation is complete, the solution filtered, and a drop or more added to potassium dichromate in concentrated sulphuric acid, will produce an emerald-green.

The solution made from saponin emulsion, treated as above described, gave the emerald-green color, while the solution from the other emulsion did not.

Several proprietary emulsions were examined according to this method but saponin was not indicated.

The Chair stated that, without objection, the paper would take the usual course.

Chairman Puckner then read his own paper on sodium bicarbonate in abstract, the following being its full text :

SODIUM BICARBONATE IN IODOMETRIC DETERMINATIONS.

W. A. PUCKNER, CHICAGO.

Methods for the volumetric estimation of phosphites* and hypophosphites,† based on their oxidation by iodine, have recently been published by Rupp and Fink. While iodine has little effect when added to phosphorous acid or to phosphites, it readily oxidizes them to phosphate, accord-

* Berichte. d. d. Chem. Gesell., 35, 3691.

† Arch. d. Pharm., 240, 663 (Chem. Centrbl., 1903, 1, 419).

ing to $\text{H}_3\text{PO}_3 + \text{I}_2 + \text{H}_2\text{O} = 2\text{HI} + \text{H}_3\text{PO}_4$, when an excess of sodium bicarbonate is added to the solutions. Accordingly, they direct to estimate phosphites by treating them with an excess of volumetric iodine solution in presence of sodium bicarbonate, and after two hours to determine the residual iodine. On the other hand, the oxidation of hypophosphites with iodine takes place very slowly in a neutral or alkaline solution, but quite rapidly when the solution is rendered acid, the speed of the reaction being directly proportional to the degree of dissociation of the acid, until all hypophosphite has been oxidized to phosphite, when, as found for phosphites, the reaction becomes very slow. And to estimate hypophosphites the authors direct to carry out the oxidation first in an acid solution, then to add sodium bicarbonate and to permit the oxidation to phosphate to take place.

Recently, while investigating the reduction of hypophosphites by silver solutions, formation of phosphite as well as phosphate was indicated, and an attempt was made to estimate the former by the method of Rupp and Fink. The results obtained were, however, not considered reliable. After some experimentation it was seen that my poor results were to be ascribed to the absorption of iodine by the sodium bicarbonate, and that the quantity of iodine lost depended on conditions which could not readily be corrected for by "running a blank."

With a view of determining the cause of this loss of iodine and to ascertain the effect of time, temperature, concentration, etc., upon the quantity of free iodine absorbed, the appended experiments, tabulated in the order in which they were made, were carried out.

While it is well known that a sodium hydroxide solution reacts with free iodine with formation of hypoiodite and iodide, $2\text{NaOH} + \text{I}_2 = \text{NaI} + \text{NaIO} + \text{H}_2\text{O}$, the hypoiodite quickly forming iodate, $3\text{NaIO} = 2\text{NaI} + \text{NaIO}_3$, and that sodium carbonate being partly hydrolyzed when in solution, $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} = \text{NaOH} + \text{NaHCO}_3$, reacts in the same way, it is generally understood that sodium bicarbonate is without effect on iodine. And, when in iodometric estimations addition of sodium bicarbonate is indicated, little attention is given the amount added as long as it is known to be an excess. The results in A, B and C therefore were startling; indicating as they did, that when using 1 to 2 Gm. sodium bicarbonate an error of 1.5 to 4.5 Cc. decinormal iodine solution would be introduced. Two possible causes for this absorption suggested themselves; first, impurity of carbonate, sulphite or thiosulphate in the salt, and second, decomposition of bicarbonate to carbonate while dissolving it.

Examination indicating the salt to be of exceptional purity, experiments D and E were made in which a little sulphuric acid was added to the bicarbonate in order that any carbonate might be changed back to the bicarbonate. These conditions also agree more closely with those under which hypophosphites are directed to be estimated by Rupp and Fink,

namely, to add the bicarbonate to a solution previously rendered acid with sulphuric acid. The loss of iodine is less than in A, B and C, but has not been entirely overcome, and it seemed safe to conclude that it is not due to sodium carbonate contained in the bicarbonate or formed while dissolving it when starting the experiment.

While, as previously stated, the salt appeared to be of exceptional purity, yet several other brands of pure sodium bicarbonate were experimented with to prove that the iodine absorption was not peculiar to the sample first tried. They all showed about the same iodine absorption as the one first used: thus G and H were made with two other brands.

Having satisfied myself that the iodine absorption was not due to an impurity but was due to some property of sodium bicarbonate, I set out to study the effect of temperature and concentration upon the reaction. That these factors would affect the reaction was indicated by the previous experiments, thus, in A it is seen that when 1 Gm. is used then 2 Cc. iodine reacted: while, when 5 Gm. were used, the other conditions being the same, but 1.15 Cc. iodine solution was used for every gram of salt. That the temperature would affect the reaction could be concluded from the poor agreement of the duplicates in B and C, and the fact that the reaction was not complete after two hours as is shown by a comparison of B and C and also G and H.

The effect of *concentration* is shown in F, I and J. In F 1 when the total volume of the liquid in which the reaction occurred was increased from 50 Cc. to 150 Cc., the volume of decinormal iodine used for 1 Gm. sodium bicarbonate was decreased from 2.18 Cc. to 1.02 Cc. In J, when increased from 25 Cc. to 225 Cc., the volume of iodine consumed was decreased from 2.84 Cc. to 0.79 Cc.

The influence of *temperature* on the reaction is shown by a comparison of J with K, or still better, by comparing K, M1, N1, O1 and L1, thus:

Experiment.	Temperature.	Cc. $\frac{N}{10}$ iodine consumed by 1 Gm. NaHCO_3 in		
		2 hours.	4 hours.	8 hours.
K	7° C.	1.09 Cc.	1.37 Cc.	1.71 Cc.
M1	10° C.	1.31 Cc.	1.75 Cc.	1.42 Cc.
N1	20° C.	2.14 Cc.	1.98 Cc.	4.12 Cc.
O1	30° C.	3.50 Cc.	4.56 Cc.	5.05 Cc.
L1	30° C.	3.38 Cc.	3.99 Cc.	5.55 Cc.

In all experiments so far discussed 250-Cc. glass-stoppered volumetric flasks were used. At first various size flasks were used indiscriminately, but I soon began to suspect that certain irregularities depended on the size of the flask used, and I therefore discarded all results not obtained with a 250-Cc. flask, and thereafter used this size only.

The influence which the *size of the digestion flask* has on the reaction is shown by L, M, N and O. At the same time that the experiments under L1 were made, 250-Cc. flasks being used, the series L2, where 100-Cc.

flasks were used, were carried out. The same applies for M, N and O, where determinations 1 and 2 are exact duplicates, and were carried out simultaneously and side by side, except that in 1 the 250-Cc. flasks were used, and in 2 those holding 100 Cc. were employed instead.

Experiment.	Temperature.	Cc. $\frac{1}{10}$ iodine consumed by 1 Gm. NaHCO_3 in		
		2 hours.	4 hours.	8 hours.
M1	10° C.	1.31 Cc.	1.75 Cc.	1.42 Cc.
M2	10° C.	0.54 Cc.	1.41 Cc.	0.50 Cc.
N1	20° C.	2.14 Cc.	1.98 Cc.	4.12 Cc.
N2	20° C.	1.75 Cc.	1.99 Cc.	2.17 Cc.
O1	30° C.	3.50 Cc.	4.56 Cc.	5.02 Cc.
O2	30° C.	2.88 Cc.	3.36 Cc.	3.68 Cc.
L1	30° C.	3.38 Cc.	3.99 Cc.	5.55 Cc.
L2	30° C.	2.52 Cc.	2.72 Cc.	3.66 Cc.

This shows then that everything else being equal, the amount of iodine absorbed increases with the size of the flask, or more probably, as will be pointed out presently, with an increase in the volume of air in contact with the solution.

In M1 and M2 more iodine had been absorbed after four hours than after eight hours. Similarly, in N1 and in K the iodine absorption did not always increase with time. As a possible cause of these results a failure to maintain a constant temperature was considered, and series P was made to determine whether a lowering of the temperature might "reverse" the reaction. A comparison of P,a and P,d might be taken to support this view, but P,c shows that little reliance can be placed on the result, and no further attempts were made to clear up this point.

It has then been shown that a reaction occurs between sodium bicarbonate and iodine when in solution, and when sodium bicarbonate is added to a decinormal volumetric iodine solution, residual titration with sodium thio-sulphate will show a considerable loss of free iodine, and that the quantity so lost is proportional to (1) the mass of sodium bicarbonate, (2) the time of the interaction, (3) the concentration of the solution, (4) the temperature, (5) the size of the flask in which the reaction occurs.

These phenomena are in harmony with, and the results might, in a general way, have been predicted by a consideration of, the work of McCoy* and others on the behavior of sodium bicarbonate solution. When sodium bicarbonate is dissolved in water it is partly hydrolysed, thus $\text{NaHCO}_3 + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2\text{CO}_3$, and while it is a stronger acid than sodium bicarbonate, the latter, owing to its greater concentration, chiefly reacts with the sodium hydroxide formed in the hydrolysis to produce sodium carbonate, thus $\text{NaHCO}_3 + \text{NaOH} = \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$. McCoy has determined the free carbonic acid and sodium hydroxide to be exceedingly

* Equilibrium in the system composed of sodium carbonate, sodium bicarbonate, carbon dioxide and water. Dr. H. N. McCoy, American Chemical Journal, vol. xxiv, 437.

small, and represents the net result of the hydrolytic dissociation by $2\text{NaHCO}_3 = \text{Na}_2\text{CO}_3 + \text{H}_2\text{CO}_3$. In a decinormal sodium bicarbonate solution 2.68 per cent. of the bicarbonate is converted to carbonate and carbonic acid; the latter breaks up into water and carbon dioxide, and the carbon dioxide escapes into the air. This breaking up of the bicarbonate into carbonate and carbonic acid, and the carbonic acid decomposing to water and carbon dioxide, continues until the pressure of the carbon dioxide above is equal to the pressure of the gas in the solution, *i. e.*, until equilibrium has been reached. In more concentrated solutions the amount of sodium bicarbonate hydrolyzed appears to be still greater.

McCoy has determined the amount of bicarbonate in solution of varying initial concentration after air has been drawn through the solutions until they were in equilibrium with the atmosphere and found that when equilibrium was reached in a 0.1 normal (0.1 gram-atoms per liter) solution, 40 per cent. remained as bicarbonate, in a 0.3 normal solution about 23 per cent. and in a normal solution but 12.9 per cent. of the total remained as bicarbonate.

In my experiments then, sodium bicarbonate was constantly decomposing and the iodine lost was in proportion to the decomposition. And, just as McCoy finds both the initial and final bicarbonate content of dilute solutions greater than that of strong solutions, so with me dilution lessened the amount of iodine absorbed.

My experiments showing that an elevation of temperature materially increased the absorption of iodine are in accord with the results of Cameron and Briggs,* who found that while a solution of a certain strength when equilibrium had been reached, the temperature being 25 degrees, contained 36 per cent. in the form of carbonate, a solution originally of almost the same sodium bicarbonate concentration, contained when equilibrium was reached but 13.5 per cent. bicarbonate if the temperature was 37 degrees instead.

That less iodine was absorbed when smaller flasks were substituted for those otherwise used is probably again a matter of equilibrium; considering the glass stopper to completely shut off communication with the atmosphere, then carbon dioxide will escape from the solution until its pressure in the solution is equal to that of the gas above and, since a larger volume of air was contained in the larger flask, more carbon dioxide passed from the liquid to the space above it before equilibrium was established, hence more sodium bicarbonate decomposed and therefore more iodine absorbed. If, on the other hand, the stopper does not prevent diffusion of the gas out of the flask, then again the carbon dioxide from the larger flask owing to the larger neck, etc., will diffuse more rapidly, causing the bicarbonate to decompose more quickly and therefore consume more iodine.

Having determined the cause of the loss of iodine, experiments Q, R

* J. Physical Chem., 5, 537.

and S were made. They show that the absorption* of iodine can be prevented when the solution is sufficiently dilute and at the same time much carbon dioxide is present; thus, when 1 Gm. sodium bicarbonate was dissolved in 100–200 Cc. carbonated water, 25 Cc. decinormal iodine solution added and allowed to stand for four hours no loss of iodine was shown. While loss of iodine can be prevented in this way it will now have to be determined whether under these conditions, namely, the solution saturated with carbonic acid, the oxidation of phosphites by means of iodine can still be accomplished. Such determinations are now being tried and will be published soon.

EXPERIMENTAL DATA.

A. Into 250-Cc. glass-stoppered volumetric flasks † was placed a) none, b) 1 Gm., c) 2 Gm., d) 3 Gm., e) 5 Gm. sodium bicarbonate, 25 Cc. water was added, solution facilitated by gentle agitation, then 25 Cc. approximately decinormal iodine volumetric solution added, and the flask gently rotated to dissolve any remaining solid bicarbonate. After one hour the free iodine in each flask was determined by means of sodium thiosulphate solution. The volume of thiosulphate used in b), c), d) and e), deducted from that used in a), gives the volume of decinormal iodine consumed; this divided by the grams of sodium bicarbonate taken, shows the volume of iodine solution absorbed for every gram of bicarbonate.

1. Total Cc. iodine absorbed: b) 2 Cc., c) 3.95 Cc., d) 4.30 Cc., e) 5.75 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2 Cc., c) 1.98 Cc., d) 1.43 Cc., e) 1.15 Cc.

B. These experiments were carried out exactly as those in *A*, except that the residual iodine was determined after two hours.

1. Total Cc. iodine absorbed: b) 1.59 Cc., c) 3.34 Cc., d) 4.16 Cc., e) 5.75 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 1.59 Cc., c) 1.67 Cc., d) 1.39 Cc., e) 1.23 Cc.

2. Total Cc. iodine absorbed: b) 2.06 Cc., c) 3.63 Cc., d) 5.19 Cc., e) 6.83 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2.06 Cc., c) 1.82 Cc., d) 1.73 Cc., e) 1.37 Cc.

C. The conditions again as in *A*, except that the flasks were allowed to stand for eighteen hours before the residual iodine was determined.

1. Total Cc. iodine absorbed: b) 2.83 Cc., c) 4.53 Cc., d) 5.62 Cc., e) 6.78 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2.83 Cc., c) 2.27 Cc., d) 1.88 Cc., e) 1.36 Cc.

D. Into 250-Cc. glass-stoppered volumetric flasks were placed the usual quantities of sodium bicarbonate, 25 Cc. water added, gently agitated, then 1 Cc. normal volumetric sulphuric acid added, mixed, and then the 25 Cc. decinormal iodine solution run in. The residual iodine was determined after two hours.

1. Total Cc. iodide absorbed: b) 0.68 Cc., c) 1.12 Cc., d) 4.43 Cc., e) 5.00 Cc.

* The term absorption has been used throughout to indicate that by the agency of sodium bicarbonate free iodine had entered the combined state and hence would not react with sodium thiosulphate. While the reaction probably resulted in the formation of iodide, its exact nature has not been determined. It was expected that the iodine would react with the formation of iodide and iodate, but while at elevated temperatures such a reaction occurred, as is shown by the liberation of iodine when in *O* the finished titrations were rendered acid, no iodate was contained in the finished titrations in *M* where the digestion was made at 10°C ., and but a trace in *N* where the temperature was 20°C .

† This style flask most effectually prevents loss of iodine through volatilization.

Cc. absorbed by 1 Gm.* NaHCO_3 : b) 0.74 Cc., c) 1.11 Cc., d) 1.51 Cc., e) 1.02 Cc.

E. Into each flask was measured 25 Cc. water, 1 Cc. normal sulphuric acid added, then respectively a) none, b) 1 Gm., etc., of sodium bicarbonate added, gently agitated, 25 Cc. iodine solution added, mixed and the residual iodine determined after two hours as before.

1. Total Cc. iodine absorbed: b) 0.92 Cc., c) 2.47 Cc., d) 2.57 Cc., e) 4.70 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 1.00 Cc., c) 1.28 Cc., d) 0.88 Cc., e) 0.96 Cc.

2. Total Cc. iodine absorbed: b) 0.93 Cc., c) 1.61 Cc., d) 3.33 Cc., e) 5.30 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 1.00 Cc., c) 0.84 Cc., d) 1.14 Cc., e) 1.08 Cc.

3. Total Cc. iodine absorbed: b) 0.59 Cc., c) 2.92 Cc., d) 4.25 Cc., e) 5.74 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 0.61 Cc., c) 1.52 Cc., d) 1.46 Cc., e) 1.27 Cc.

F. Into the 250-Cc. flasks were measured a) none, b) 25 Cc., c) 50 Cc., d) 100 Cc. distilled water, to each was added 25 Cc. solution sodium bicarbonate containing 1.665 Gm. NaHCO_3 and 25 Cc. approximately decinormal iodine solution, and after two hours the iodine determined in the usual way. Along with these determinations two blanks were run: in one case 25 Cc. iodine was measured into a 250-Cc. flask, in the other case 25 Cc. iodine solution and 100 Cc. water were measured. From this blank determination (they both required the same volume of thiosulphate when titrated after two hours) the volume of thiosulphate used for a), b), c) and d) was subtracted, the remainder being the "total iodine consumed." This divided by 1.665 gives the Cc. iodine absorbed by 1 Gm. NaHCO_3 .

1. Total Cc. iodine absorbed: a) 3.63 Cc., b) 2.35 Cc., c) 2.55 Cc., d) 1.69 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : a) 2.18 Cc., b) 1.41 Cc., c) 1.53 Cc., d) 1.02 Cc.

2. Total Cc. iodine absorbed: a) 2.46 Cc., b) 2.30 Cc., c) 2.21 Cc., d) 2.04 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : a) 1.48 Cc., b) 1.37 Cc., c) 1.33 Cc., d) 1.23 Cc.

G. The experiments are duplicates of those given under *F*, except that another brand of sodium bicarbonate, and that the 25 Cc. of water used in *F* were omitted, *i. e.*, into 250-Cc. flasks were placed a) none, b) 1 Gm., c) 2 Gm., d) 3 Gm., e) 5 Gm. sodium bicarbonate, to each 25 Cc. iodine solution added, the flask gently rotated to dissolve as much of the salt as possible and after two hours the remaining free iodine determined.

1. Total Cc. iodine absorbed: b) 2.92 Cc., c) 4.93 Cc., d) 6.18 Cc., e) 6.53 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2.92 Cc., c) 2.57 Cc., d) 2.06 Cc., e) 1.31 Cc.

2. Total Cc. iodine absorbed: b) 2.98 Cc., c) 4.62 Cc., d) 5.52 Cc., e) 6.25 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2.98 Cc., c) 2.31 Cc., d) 1.84 Cc., e) 1.25 Cc.

H. Conditions of the experiment as in *G*, except that the residual iodine was determined after ten minutes.

1. Total Cc. iodine absorbed: b) 2.97 Cc., c) 3.78 Cc., d) 4.54 Cc., e) 4.36 Cc.

Cc. absorbed by 1 Gm. NaHCO_3 : b) 2.07 Cc., c) 1.89 Cc., d) 1.51 Cc., e) 0.87 Cc.

I. 1 Gm. sodium bicarbonate was dissolved, respectively, in a) 50 Cc., b) 100 Cc., c) 200 Cc. distilled water, 25 Cc. iodine solution added and the iodine determined after two hours, the temperature of the solutions and the room being about 10°C . The Cc. thiosulphate used, subtracted from that used for a "blank" carried out at the same time, showed that 1 Gm. sodium bicarbonate had consumed of decinormal iodine: a) 0.80 Cc., b) 0.75 Cc., c) 0.70 Cc.

J. 1 Gm. sodium bicarbonate dissolved in a) none, b) 50 Cc., c) 100 Cc., d) 200 Cc. water, to each 25 Cc. iodine solution added and titrated with thiosulphate after two hours, the temperature being 19°C . throughout, was found to have absorbed: a) 2.84 Cc., b) 1.53 Cc., c) 1.34 Cc., d) 0.79 Cc.

K. Sodium bicarbonate was dissolved in water having a temperature of 7°C . Into

* It is assumed that 1 Cc. normal sulphuric acid neutralized 0.08 Gm. sodium bicarbonate and that the quantities used were b) 0.916 Gm., c) 1.916 Gm., d) 2.916 Gm., and e) 4.916 Gm.

each flask was measured 25 Cc. of the sodium bicarbonate solution containing 1 Gm. salt and the flasks immersed in water at the same temperature and 25 Cc. decinormal iodine solution added, also having a temperature of 7° C. and the iodine determined a) at once, b) after ten minutes, c) after two hours, d) after four hours, e) after eight hours. During the digestion the flasks were kept in water having a temperature of 7-8° C. The Cc. decinormal iodine found to have combined with 1 Gm. sodium bicarbonate was: a) 1.57 Cc., b) 1.51 Cc., c) 1.09 Cc., d) 1.37 Cc., e) 1.71 Cc.

L, 1. Conditions as in *K*, except that the temperature was kept at 30° C. throughout. The residual iodine was determined after a) two hours, b) four hours, c) eight hours. 1 Gm. sodium bicarbonate was found to have reacted with a) 3.38 Cc., b) 3.99 Cc., c) 5.55 Cc. decinormal iodine solution.

2. Simultaneous with *L*, 1, another series of experiments was carried out in every way like *L*, 1, except that 100 Cc. glass-stoppered volumetric flasks were used instead of those holding 250 Cc. Here 1 Gm. sodium bicarbonate was found to have reacted with a) 2.52 Cc., b) 2.72 Cc., c) 3.66 Cc.

M, 1. Into 250-Cc. flasks were measured portions of 25 Cc. sodium bicarbonate solution containing 1 Gm. salt, and the flasks kept in water having a temperature of 10° C. for thirty minutes, then to each 25 Cc. decinormal iodine, also cooled to 10° C., added, and keeping the flasks in water at 10° C., the residual iodine was determined after a) two, b) four, and c) eight hours, and this deducted from the iodine found in "blanks" made under like conditions. Here 1 Gm. sodium bicarbonate was found to have reacted with a) 1.31 Cc., b) 1.75 Cc., c) 1.42 Cc.

On adding an excess of hydrochloric acid to the finished titration no iodine was set free, showing that it contained neither hypiodite nor iodate.

2. Simultaneously a set of experiments was made, just as *M*, 1, except that 100-Cc. flasks were used. Here 1 Gm. sodium bicarbonate was found to have reacted with a) 0.54 Cc., b) 1.41 Cc., c) 0.50 Cc.

No iodine was set free when the finished titration was acidulated.

N, 1. This series was carried out just as *M*, 1, except that the temperature was 20° C. throughout. Here 1 Gm. sodium bicarbonate reacted with a) 2.14 Cc., b) 1.98 Cc., c) 4.12 Cc.

Addition of excess of hydrochloric acid to the finished titration liberated iodine which required about, a) 0.03 Cc., b) 0.03 Cc., c) 0.08 Cc. decinormal sodium thiosulphate.

2. When using 100-Cc. flasks there disappeared, a) 1.75 Cc., b) 1.99 Cc., c) 2.17 Cc. decinormal iodine.

Addition of acid to the finished titration liberated, a) none, b) none, c) a trace of iodine.

O, 1. Proceeding as in *M*, 1, except that the temperature was kept at 30° C. Here 1 Gm. sodium bicarbonate was found to have reacted with a) 3.50 Cc., b) 4.56 Cc., c) 5.05 Cc. decinormal iodine solution.

Here addition of excess of hydrochloric acid to the finished titration liberated iodine which required a) 0.25 Cc., b) 1.49 Cc., c) 2.42 Cc. decinormal sodium thiosulphate.

2. Using 100-Cc. flasks as in *M*, 2, otherwise just as *O*, 1. There disappeared a) 2.88 Cc., b) 3.36 Cc., c) 3.68 Cc. decinormal iodine solution.

Acidulating the finished titration liberated iodine which required (a) 0.08 Cc., (b) 0.53 Cc., (c) 1.30 Cc. decinormal sodium thiosulphate.

P. 10 Gm. sodium bicarbonate were dissolved by gentle agitation in water at 20° C. to make 250 Cc. and kept at this temperature for one-half hour. Then portions of 25 Cc. were measured into 250-Cc. flasks, to each 25 Cc. decinormal iodine solution, also at 20° C., were added, and this kept at 20° C. for a) two, b) four, c) six hours. A fourth flask, similarly charged, was kept at 20 degrees for four hours, and then at 10 degrees for two hours. The volume of decinormal iodine solution absorbed was found to be: a) 2.16 Cc., b) 2.57 Cc., c) 2.13 Cc., d) 1.67 Cc.

Q. 10 Gm. sodium bicarbonate were dissolved in sufficient water, having a temperature of 10° C., to make 250 Cc., and this, immersed in water at 10° C., saturated with carbon dioxide.

1. 25 Cc. of this solution measured into a 50-Cc. flask, 25 Cc. iodine solution are added, kept in water at 20° C. for two hours, and then titrated with thiosulphate. This, deducted from the thiosulphate required for 25 Cc. iodine, diluted with 25 Cc. water in a 50-Cc. flask after standing two hours, showed that 1 Gm. sodium bicarbonate had reacted with 0.37 Cc. decinormal iodine.

2. When a 250-Cc. flask was used, otherwise everything as in 1, then 0.61 Cc. had reacted.

3. Into a 250-Cc. flask 25 Cc. of the sodium bicarbonate solution was measured, 150 Cc. distilled water added, then 25 Cc. decinormal iodine solution, kept at 20° C. for two hours, and then the iodine determined. This, subtracted from a blank, showed that under these conditions 0.21 Cc. decinormal iodine had reacted with 1 Gm. sodium bicarbonate.

4. Everything as in 3, except that instead of 150 Cc. distilled water, the same volume of water saturated with carbon dioxide was used. After two hours it was found that this required the same volume of thiosulphate solution as did the blank where 25 Cc. iodine solution had been mixed with 150 Cc. carbonated water and allowed to stand two hours. Under these conditions, therefore, the sodium bicarbonate does not react with free iodine.

R. To 1 Gm. sodium bicarbonate contained in 250-Cc. or 100-Cc. flasks, was added water at 10° C. and charged with carbon dioxide at this temperature in amounts given below, rotated until solution had occurred, then 25 Cc. decinormal iodine solution added, kept at a constant temperature of 20° C. for four hours, and then the iodine determined in the usual manner. Side by side with these a series was carried out where recently distilled water was substituted for the water saturated with carbon dioxide. The results were:

1 Gm. NaHCO ₃ , in 250-Cc. flask, with 25 Cc.					CO ₂ -water, consumed 0.56 Cc. $\frac{N}{10}$ iodine.					
I	"	250	"	200	"	"	"	0.00	"	"
I	"	100	"	25	"	"	"	0.45	"	"
I	"	100	"	75	"	"	"	0.20	"	"
I	"	250	"	25	"	dist. water	"	1.78	"	"
I	"	250	"	200	"	"	"	1.19	"	"
I	"	100	"	25	"	"	"	1.24	"	"
I	"	100	"	75	"	"	"	1.09	"	"

S. Preparation of carbonated water, temperature and time of digestion just as in Q.

1 Gm. NaHCO ₃ , in 100-Cc. flask, with				0 Cc. CO ₂ -water, consumed 2.13 Cc. $\frac{N}{10}$ iodine.						
I	"	100	"	"	25	"	"	0.54	"	"
I	"	100	"	"	50	"	"	0.34	"	"
I	"	100	"	"	75	"	"	0.13	"	"
I	"	250	"	"	0	"	"	2.58	"	"
I	"	250	"	"	25	"	"	0.98	"	"
I	"	250	"	"	100	"	"	0.06	"	"
I	"	250	"	"	200	"	"	0.05	"	"
I	"	500	"	"	200	"	"	0.00	"	"
I	"	500	"	"	400	"	"	0.01	"	"

[Contributions from the Pharmaceutical-Chemical Institute of the University of Marburg.]

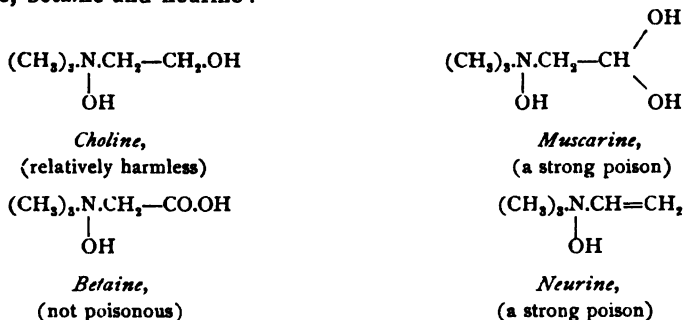
CONCERNING CHOLINE, NEURINE, AND ALLIED COMPOUNDS.

BY ERNST SCHMIDT.

(Translated from the original German by Richard Fischer, Madison, Wis.)

In 1891 I published in Liebig's Annalen * a series of investigations concerning choline, neurine and related bases. The object of these investigations, carried on with the coöperation of J. Weiss, J. Bode, and A. Partheil, was on the one hand the more detailed study of the chemical behavior of these bases, which are of considerable phyto- and zoö-chemical interest; on the other hand, the study of the relations existing in these and other trimethylamine derivatives between chemical constitution and physiological action.

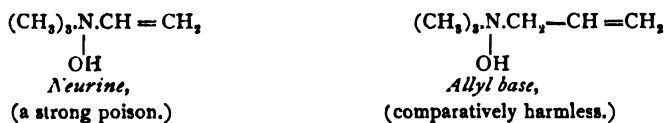
From the fundamental forms of this class of bodies, viz., choline, muscarine, betaine and neurine :



the remarkable fact was observed that apparently small chemical differences may bring with them great differences in physiological action. It was further shown that the acetenyl group ($-\text{C}=\text{CH}$) in combination with trimethylamine, caused even a stronger toxicity than the presence of the vinyl group ($-\text{CH}=\text{CH}_2$) under like conditions :

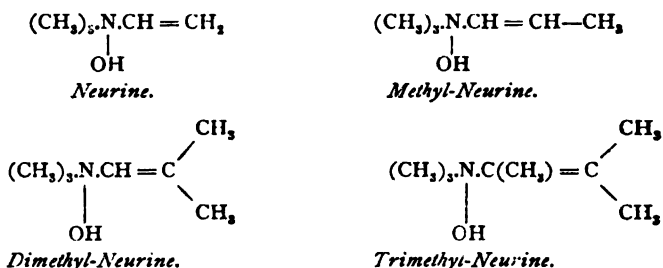


On the other hand, the remarkable fact was discovered that allyl-trimethyl-ammonium hydroxide was a relatively harmless substance, whose action resembled neither that of neurine nor that of the acetenyl base.



* Annal. d. Chemie, 267, p. 249; 268, p. 143.

This observation led to the examination of some other similarly constituted trimethylamine derivatives, and to that end the then unknown homologues of neurine, the methyl, dimethyl and trimethyl neurines :



appeared to be bases which would allow of an even more direct comparison of their action with that of neurine.

A. METHYL-NEURINE.

The investigations which G. Kleine* undertook at my instigation showed that although methyl-neurine was present in the products of reaction between propylene bromine and trimethylamine, it was formed in such small quantities that its presence had been entirely overlooked by J. Weiss and C. F. Roth who had previously made a study of this base. A physiological examination of the monomethyl neurine was therefore omitted for the present.

In the cases of dimethyl and trimethyl neurine the conditions were more favorable, since these bases could be isolated in considerable quantities from the products of reaction between isobutylene bromide and amylene bromide. Concerning the physiological action of the neurines, Prof. Hans Meyer reported to me as follows :

"The action of dimethyl neurine (isocrotyl-dimethyl-ammonium chloride) and of trimethyl neurine (valeryl-trimethyl-ammonium chloride) resemble that of allyl-trimethyl-ammonium chloride (the allyl base). All three of these compounds cause a strong increase of glandular secretions (salivary, lachrymal, perspiratory, etc.), and at the same time a more or less pronounced paralysis of the nerve filaments in the striated muscles, which latter action may cause death through failure of respiration.

The circulatory organs are not affected, excepting a decrease in the pulse beat, which action is pronounced in frogs only ; nor is there any marked effect upon the smooth muscles of the stomach, the intestines, or the iris of the eye.

Quantitatively, however, there are not unappreciable differences in the action of the three bases ; differences which are less marked in the increase of glandular secretions, than in the curare-like paralysis.

* Inauguraldiss. Marburg.

The valeryl base is the most active ; 0.01 Gm. suffices to cause complete and permanent paralysis in a frog in fifteen minutes ; 0.02 Gm., subcutaneously introduced, will cause death within three to four minutes in a medium-sized guinea-pig. The allyl base is only slightly less powerful, while the remarkable fact exists that the isocrotyl base, though occupying an intermediate position in the homologous series, is decidedly less active. A rabbit (of 1500 Gm.) showed no symptoms of paralysis from the subcutaneous injection of 0.05 Gm. of the base ; neither did a guinea pig from 0.02 Gm., nor a pigeon from 0.05 Gm. With frogs, likewise, the injection of 0.02 Gm. caused no paralysis, and even the intervenous injection of 0.015 Gm. caused only very incomplete paralysis of the secretory muscles and of the diaphragm."

With the introduction of methyl groups into the side chain of neurine, a decrease and at the same time a change in physiological action had therefore taken place. It is remarkable, however, that the thrice-methylated neurine is more active than the twice-methylated base. This goes to show that the decrease of toxicity is not dependent upon the length of the side chain alone, but that the constitution of the base, *i. e.*, the grouping of the side chains in it, are of influence.

The action of the propylene bromide, isobutylene bromide, and amylene bromide upon trimethylamine, the formation of the methylated neurine, can only be the result of a secondary reaction, since in all these cases the alkylene bromides first split off hydrobromic acid, and through this the formation of a brom-substituted alkylene takes place. The latter bromides in the nascent state then form addition-compounds with trimethylamine, methylated neurines resulting. This reaction is of interest, since the brom-alkylenes as such, unless they contain the group $-\text{CH}_2\text{Br}$, do not seem to form addition-compounds with trimethylamine. A. W. Hofmann, and later T. Bode* had therefore attempted in vain to bring about a reaction between vinyl bromide and ammonia on trimethylamine.

The same conditions prevail with isocrotyl bromide ($\begin{smallmatrix} \text{CH}_3 \\ \text{CH}_3 \end{smallmatrix} > \text{C} = \text{CHBr}$), as shown by the investigations of G. Kleine.

These observations are in conformity with the statement of Reboul,† that of the three isomeric monobromopropylenes :



The allyl bromide alone formed direct addition-products with amine bases, a reaction which was subsequently studied in detail by A. Partheil ‡ in the case of trimethylamine.

* Annalen d. Chem., 267, p. 276.

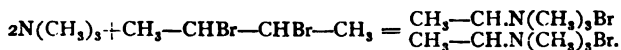
† Chem. Centralbl., 1881, pp. 538 and 621

‡ Annalen d. Chem., 268, p. 152.

Somewhat different from the reaction between isobutylene bromide ($\text{CH}_3 > \text{CBr}-\text{CH}_2\text{Br}$) and trimethylamine is the action of pseudobutylene bromide ($\text{CH}_3-\text{CHBr}-\text{CHBr}-\text{CH}_3$) upon the same base under like conditions. For although the latter bromide is also split up for the greater part under the influence of an alcoholic trimethylamine solution into hydrobromic acid and pseudocrotyl bromide, according to the reaction,



no addition-products of this pseudocrotyl bromide with methylamine could be isolated. However, a small quantity of hexamethyl-pseudo-butylene-diamine bromide was isolated, whose formation can be explained by the following equation :



From the above and from observations more completely described elsewhere, a certain regularity can be observed in the action of trimethylamine upon alkylene bromides, as well as upon halogen-substituted alkynes. Just as with the latter, the ability of forming addition-compounds depends upon the presence of one $-\text{CH}_2\text{Br}$ group, so with the former it is dependent upon the presence of two $-\text{CH}_2\text{Br}$ groups.

According to our present knowledge, ethylene bromide ($\text{CH}_2\text{Br}.\text{CH}_2\text{Br}$) and trimethylene bromide alone, readily form addition-products with trimethylamine; and of these bromides, depending upon the conditions of the experiment, one molecule combines with either one or two molecules of trimethylamine, as shown by the investigations of A. W. Hofmann,* J. Bode,† G. Kleine,‡ C. F. Roth,§ J. Weiss,|| and A. Partheil.¶

Roth and Weiss (l. c.) have already shown that ethylidene chloride ($\text{CH}_3-\text{CHCl}_2$) does not react with trimethylamine. Even when I allowed the chemically more active ethylidene bromide ($\text{CH}_3.\text{CHBr}_2$) to react with trimethylamine under various conditions, I could only isolate trimethylamine bromide as a product of the reaction. It was impossible in any of these experiments to show the formation of neurine, due to a combination of trimethylamine with vinyl bromide in the nascent state.

Propylene bromide ($\text{CH}_3.\text{CHBr}.\text{CH}_2\text{Br}$), isobutylene bromide ($\text{CH}_3 > \text{CBr}-\text{CH}_2\text{Br}$), pseudobutylene bromide ($\text{CH}_3.\text{CHBr}.\text{CHBr}.\text{CH}_3$),

* Chem. Centralbl., 1858, p. 913.

† Annal. d. Chem., 267, p. 268.

‡ Inauguraldiss., Marburg.

§ Ber. d. Chem. Ges., 14, p. 1351.

|| Zeitschr. f. Naturw.

¶ Annal. d. Chem., 268, p. 177.

and amylene bromide ($\begin{smallmatrix} \text{CH}_3 \\ \text{CH}_3 \end{smallmatrix} > \text{CBr} \cdot \text{CHBr} \cdot \text{CH}_3$), as already indicated above, do not form direct addition-products with trimethylamine, although propylene and isobutylene bromide each contain one $-\text{CH}_2\text{Br}$ group.

The twice symmetrically methylated ethylene bromide (pseudobutylene bromide) and the thrice-methylated ethylene bromide (tertiary amylene bromide) show a certain resemblance to ethylene bromide, in so far as they have the power, although only to a slight extent, of adding two molecules of trimethylamine to one of the bromide.

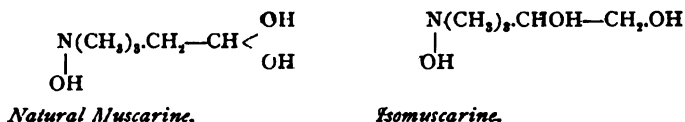
As already stated, propylene, isobutylene, pseudobutylene and amylene bromides, under the influence of alcoholic trimethylamine solution, all split off hydrobromic acid. Of the monohalogen-substituted olefines thus formed, pseudocrotyl bromide does not react at all with trimethylamine, monobromopropylene but slightly, while isocrotyl and valeryl bromide form addition-products in much greater abundance.

As with the alkylhalogens, so likewise in the case of the alkylenehalogens, the bromides, and to a still greater extent the iodides, are characterized by much greater chemical activity than the chlorides.

Methylene iodide (CH_2I_2) resembles alkylene bromides with two $-\text{CH}_2\text{Br}$ groups in its behavior towards trimethylamine, in that it readily adds one molecule of trimethylamine, but it was found impossible to combine it with two molecules of this base, thus showing a different behavior than ethylene bromide and trimethylamine bromide.

B. MUSCARINE.

In the physiological examination of the isomeric muscarines, the natural muscarine from mushrooms, and the isomuscarine of Bode, both of which were prepared in this laboratory,

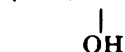


Prof. H. Meyer had observed decided differences :

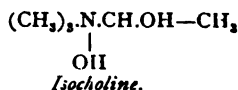
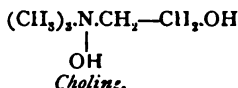
"Isomuscarine shows a decidedly different behavior toward the animal organism than the natural and the synthetic muscarines. With frogs there is still a certain resemblance : after an injection of isomuscarine the action of the heart assumes a distinctly diastolic character and becomes decidedly slower, without however coming to a complete standstill. Severing both 'nervi vagi' does not stop this action, but the application of atropine does ; we therefore have to deal with a weak muscarine-like action. With mammals the action is essentially different. A slowing of the pulse also results here, but this is caused by an irritation of the cen-

tral vagus ganglia; only in large doses (10–15 Mg.) administered by intervenous injection, does an irritation of the intercordial retarding apparatus result. While muscarine diminishes the arterial pressure, the opposite effect is produced by isomuscarine: after every injection there is a decided increase, due to an irritation of the nerve centres. Isomuscarine affects neither the intestines nor the iris of mammals, but it has a contractile action upon the iris of birds almost as marked as muscarine. The glands seem to be excited by isomuscarine the same as by muscarine. With guinea pigs and cats excessive salivation and lachrymation result. In common with all ammonium bases, isomuscarine shows a pronounced curare action, which becomes a foremost symptom in cases of poisoning in mammals."

The above observations furnished the inducement for the examination of the other muscarines: choline muscarine, obtained by the oxidation of choline, and the base prepared by Berlinerblau: *



which may be called pseudomuscarine. It likewise became of interest to compare choline and isocholine:



both chemically and physiologically.

The latter part of the problem, however, still remains unsolved, since up to the present time, in spite of numerous attempts, I have not succeeded in preparing isocholine. Together with G. Nothnagel,† however, I have made an exhaustive study of the four muscarines: mushroom-muscarine, choline-muscarine, isomuscarine and pseudomuscarine. This investigation was partly curtailed by the difficulty of obtaining natural muscarine in sufficient quantities in a pure state. The fly-fungi, which grow near Marburg, contained only very small quantities of muscarine during the years in which we examined them, and the isolation of the base was rendered still more difficult because we were not in a position to immediately make a physiological assay of the various readily-decomposable products to determine their content in pure muscarine.

Considering the differences in chemical behavior between isomuscarine and pseudomuscarine, a corresponding difference in their physiological action was expected, an assumption which was completely verified by experiment. In the case of mushroom-muscarine and choline-muscarine the conditions were different. These bases show such a correspondence in their chemical behavior that they might be considered identical. That

* Ber. d. Chem. Gesellsch., 17, p. 1139.

† Arch. d. Pharm., 1894, p. 261.

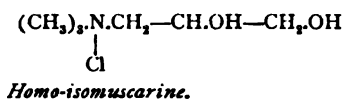
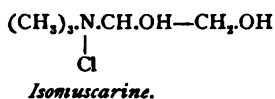
this, nevertheless, is not the case, is proved by the following data, which I owe to the kindness of my colleague, Hans Meyer :

Boehm has already stated that synthetic muscarine, even in very small quantities ($\frac{1}{10}$ — $\frac{1}{20}$ Mgs. and even less), paralyzes the intermuscular nerve terminals of a frog, while no such action was known from the use of natural muscarine ; from these facts Boehm concludes that the two substances could not be identical. I can completely corroborate the above statements of Boehm and supplement them, since I also made comparative tests with natural muscarine and could find no traces of any paralysis even in doses of 6 Mgs. ; the action of the heart was kept up by the frequent use of small quantities of atropine, which practice was also followed in the parallel experiments with synthetic muscarine.

I also found a pronounced difference in the action of the two substances on the pupil of a bird's eye : 1 to 2 drops of a 1 per cent. solution of a pure synthetic muscarine cause a maximum myosis within a few minutes, while natural muscarine was without effect, even in concentrated solution.

Pseudomuscarine, prepared according to Berlinerblau, has no effect whatever upon the action of a frog's heart, even in doses of 1 Cg. The statement of Glaue could not be verified. Neither does this base act upon the eye of a cat, nor has it any retarding effect upon the vagus in the heart of mammals, even upon direct injection of several centigrams into the jugular vein. However, decided salivation and perspiration are caused by this base, the same as by most ammonium bases. Death in mammals is caused by paralysis of respiration.

The psychological action of neurine, of allyl-trimethyl-ammonium bromide and of the other homologues of neurine had taught us that a lengthening of the side chain which is attached to the trimethylamine nucleus causes a considerable decrease of toxicity. This led to the study of other bases in this respect, isomuscarine and homo-isomuscarine



being chosen for this purpose.

Fragmentary data concerning the chloride of homo-isomuscarine (glyceryl trimethyl-ammonium chloride) have already been published by Victor Meyer* and by Hanriot,† but these proved too meagre for settling the above question, since but little is mentioned by these investigators concerning the chemical properties, and nothing at all concerning the physiological properties of this compound. At my instigation, Th. Scholten, and subsequently H. Hartmann‡ renewed the examination of this base.

* Ber. d. Chem. Ges., 2, p. 186.

† *Ibid.*, 12, 284.

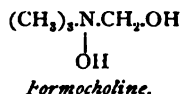
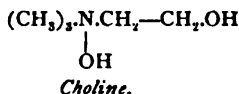
‡ Inauguraldissert., Marburg.

The study of this compound proved that chemically it showed a certain similarity to isomuscarine and choline. In physiological respects the presumption expressed above was confirmed. On this subject Prof. Hans Meyer reports as follows:

"In comparing the action of homo-isomuscarine with that of isomuscarine, the repeatedly observed rule should be confirmed, that with an increase in the length of the side-chain the toxicity of a compound is decreased, while isomuscarine, as previously stated, has a moderately strong action resembling that of artificial muscarine (oxycholine), homo-isomuscarine is practically harmless, since in doses of 0.05–0.08 Gm. it has no noticeable effect upon frogs or mice, nor upon rabbits in corresponding doses."

C. CHOLINE.

After it had been shown in the cases of neurine and isomuscarine that a lengthening of the side-chain which is attached to the trimethylamine nucleus was accompanied by a decrease in toxicity, it became of interest to determine what effect a shortening of the side-chain had upon a relatively non-toxic base. The lower homologue of choline, which may be designated as formocholine:



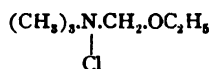
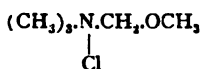
seemed to be a suitable substance for this purpose.

This latter compound was prepared by A. W. Hofmann,* by continued boiling of moist silver oxide with the addition-product of methylene iodide and trimethylamine, but was examined only in the form of its platinum salt. A repetition of these experiments seemed desirable, especially in consideration of the observations made with choline. F. M. Litterscheid, at my suggestion, took up this work. In the course of these investigations, decided differences became apparent in the behavior of trimethylamine methylene iodide and of formocholine on the one hand, and the corresponding homologues of the ethylene series on the other. Especially remarkable was the ease with which these methylene compounds changed into derivatives of tetramethyl-ammonium hydroxide.

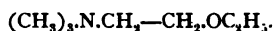
The small yield of formocholine resulting upon boiling trimethylamine-methylene iodide with moist silver oxide, led me to investigate whether this base could not be obtained by another method, viz., by the action of chlormethyl alcohol upon trimethylamine. However, the experiments which F. M. Litterscheid† and C. Thimme conducted at my instigation proved that this method gave no direct results. On the other hand, esters of formocholine, particularly methyl and ethyl esters:

* Chem. Centralbl., 1860, p. 170.

† Annal. d. Chem., 316, p. 157.



could readily be thus prepared; these compounds show much greater stability than formocholine, which latter readily splits off formaldehyde. Of these esters, the ethyl ester was mainly used for a comparison of the physiological action of formocholine and choline, since there was little difficulty experienced in synthesizing the corresponding choline derivative:



The examination of these compounds showed the remarkable result, that the introduction of an ethyl group into the choline molecule caused a decided increase of toxicity. The indirect lengthening of the side-chain by forming an ethoxy-group ($\text{O}\cdot\text{C}_2\text{H}_5$) has therefore had an effect opposite to that which has been often observed by a direct addition to the carbon nucleus. Less difference in the toxic strength of the two homologues was here observed than in the case of the allied bases. Prof. H. Meyer kindly furnished the following report:

"In comparing choline ethyl ester and formocholine ethyl ester, the difference in toxic action is not very pronounced. It must first be observed that choline, which in itself is only slightly poisonous, becomes a physiologically very active substance through the introduction of an ethyl group into the hydroxyl. The action of this latter substance resembles that of artificial muscarine (oxycholine), with the exception of its effect upon the iris of a bird. Formocholine ethyl ester shows on the whole the same type of physiological action, with a few slight differences in respect to the effect on the central nervous system. Its action seems to be slightly, though not very markedly, more pronounced than that of the choline ester."

There being no further papers, and no new business before the Section, the Chair announced that the next order was the installation of officers. He said he wanted to take this opportunity to express his sincere appreciation of the assistance given him by his associates on the Committee, and commended the action of the Section for its selection of Messrs. Gane and Caspari for Chairman and Secretary, respectively. He thought the idea was an excellent one, to thus recognize those who had been active on the Committee.

Mr. Puckner then introduced Mr. E. H. Gane as the new Chairman of the Section, and Mr. Chas. E. Caspari as its new Secretary.

Mr. Gane expressed his thanks for the honor conferred, and took the chair.

Mr. Wilbert thought the Section should extend a vote of thanks to the retiring Chairman—and especially for the admirable programme provided

for this year, which example he hoped would be followed in future. Mr. Mayo, in seconding and amending the motion, remarked that the Section had never had so modest and so *low-voiced* a corps of officers as that of the year just closing, nor more effective or efficient workers, and he thought the Section should give all of them a cordial vote of thanks. And the motion was so put and carried.

Mr. Gane, the new Chairman, announced that the officers had selected as their associate for the coming year Mr. Daniel Base, of Baltimore.

The reading of the minutes was dispensed with, and, on motion of Mr. Mayo, the Section stood finally adjourned.

MINUTES

OF THE

COMMITTEE ON HISTORICAL PHARMACY.

FIRST (AND ONLY) SESSION—TUESDAY EVENING, SEPTEMBER 6, 1904.

The session was opened at 8:15 p. m., with a fine attendance, in the Club-Room of the Coates House, with President Hopp in the chair. Mr. Hopp stated that as this was a general session of the Association for the purpose of hearing the report of the Committee on Historical Pharmacy, there would be no minutes read, and the only business before the Association would be the proceedings of that Committee, of which Mr. Kremers was Chairman.

Mr. Kremers then took the chair, at request of the President.

Mr. Kremers, as the first order of business, read his address as Chairman :

REPORT OF THE HISTORICAL COMMITTEE.

The first meeting of the Historical Committee called to order by President Payne at Mackinac, was an unexpected success. We trust that the papers presented this year will prove no less valuable as a contribution to the Proceedings of this year's meeting.

The historical work of this Association was organized in the form of a committee for two reasons: Should the work not appeal to the Society, it could with perfect ease be disorganized by a mere discontinuance of the committee. However, in case of a successful beginning, it could at any time be converted into a section, and thus be given a permanent place in the organization of this Association.

To your Chairman it would seem that the time has come for the second step to be taken. In the medical fraternity historical activity has assumed astounding proportions throughout the civilized world, so that special journals have been established to accommodate the literary output along these lines. Medical museums have also been established at different places. In pharmacy the interest has been equally keen, though the number of workers is much smaller. Steps, however, should be taken to crystallize the work; a safe home must be found for the historical documents that are being collected for this Association; a permanent organization of such a character should be given to this activity that it may not only be perpetuated, but that it may be imbued with new life each year.

The organization of sections in this Association has done much to stimulate its various

activities along commercial, scientific, educational and other lines. Of such an organization the historical work is in need. Though the work is to deal with the past, it needs the new blood and ideas of a Chairman and of a Secretary who are elected annually. Owing to their peculiar tastes and aptitudes the change in the Chairmanship would secure for us, in the course of time, a series of addresses on historical topics that would prove valuable as well as diversified. Such diversity is not only desirable, but is essential to the success of this work.

In order to make successful consecutive work possible, which will be equally necessary to this new department of Association activity, the office of Historian might be created, such office to be permanent and its occupant to be delegated as associate to the succeeding Chairmen of this Section.

These suggestions will, no doubt, suffice for the present. If the Association sees fit to organize an Historical Section, such a Section can best provide for the details of its organization when this is effected.

The activities of this new Section should by no means be confined to the reading of papers on historical topics. No work to be accomplished will be more important at present than the collection of documents and other objects of historical interest, and the establishment of a national pharmaceutical museum. Although, for apparent reasons, no special effort has been made to collect such objects thus far, the need of a safe repository is already making itself felt. Dr. Frederick Hoffman, formerly an active and now an honorary member of this Association, has generously consented to donate his numerous historical books, pamphlets, photographs, etc., to this body, provided a national pharmaceutical museum be established, preferably at Washington.

The Priestley collection was turned over to the National Museum at Washington after the centennial at Philadelphia in 1876. The establishment of a pharmaceutical section in the National Museum ought to be a possibility if requested by this Association. A letter of inquiry has been addressed to the Secretary of the National Museum, asking what steps should be taken on our part to bring this about. Your Chairman has hoped to be favored with a reply in time for this meeting, but has been disappointed. A committee ought to be appointed to confer with the proper authorities at Washington so that the Hoffmann collection may not be lost to this Association and country. No doubt others will follow the good example as soon as we have a safe repository. As it is at present we dare not ask for donations of any value.

While this Section should at all times welcome papers on any and every subject in which its members are interested, there is possibly no Section in which well-directed, systematic efforts, may be better applied over a series of years than in this one. If, on the one hand, it is exceedingly important to begin the collection of objects of historic interest at once, it is equally important to the future historian of American pharmacy to find the details of our history well prepared. In order to take an inventory of the available material, also to point out the numerous deficiencies, your Chairman has begun the compilation of a "Bibliography of American Pharmaceutical History."

I. Pharmacy among the primitive peoples of the American continent and the present dependencies of the United States.

A. General.

- B. 1. North American Indians.
2. Indians of Mexico and Central America.
3. South American Indians.
4. Esquimaux.
5. Samoans.
6. Hawaiians, native.
7. Filipinos, native tribes.

II. Colonial Period.

- A. Spanish colonies.
- B. English colonies.
- C. French colonies.
- D. Dutch colonies, etc.

III. United States of America.

IV. Dominion of Canada.

V. Mexico and other Spanish-American states.

The bibliography of our own country will naturally receive most of our attention. A somewhat detailed subdivision of the subject has, therefore, been effected.

I. GENERAL.

1. *Libraries.*

- a. Government libraries.
- b. University and college libraries.
- c. Public libraries.
- d. Special Americana in private possession.

2. *Journals.*

An alphabetical list of journals with brief account of each.

3. *Scientific Works.*

An alphabetical list, with brief statement of contents, dates of editions and reprints, references to reviews of each edition.

4. *College Catalogues.*

Arranged alphabetically according to colleges, giving years in which issued, and when omitted. Enumeration of places where sets can be found.

5. *Newspaper Items.*

Collection of clippings pertaining to pharmacy from newspaper clipping bureaus.

6. *Catalogues and Price Lists.*

Alphabetical list according to manufacturers and jobbers, giving dates of publication and places where files can be found. Also brief account of contents, *i. e.*, lines of goods manufactured or sold, and brief account of history of each firm and reference of each firm, and reference to articles where fuller information can be found.

7. *Directories of Drug Trade.*8. *Special Monographs, Articles and Reports, e. g.*

- 1. Addresses delivered at Philadelphia at jubilee meeting.
- 2. Reviews of the drug market.
- 3. Drug imports and government regulations relating thereto.
- 4. Cultivation of medicinal plants, etc.
- 5. On manufacturing, *e. g.*, quinine, fluid extracts, pills, tablets, etc.
- 6. Patents effecting the drug trade.

II. SPECIAL.

A. *States.*

- 1. Proceedings of state associations, dates of publication, and places where files can be found.
- 2. Copies of bills and laws, with lists of references to laws regulating sale of poisons, etc., previous to the enactment of general pharmacy laws.
- 3. List of journals published in State.
- 4. List of colleges.
- 5. List of manufacturers.
- 6. List of jobbers.
- 7. Monographs.

8. Special papers. Titles arranged chronologically and references to place of publication. Brief abstract.
 9. Museums and libraries.
 10. County organizations.
- B. *Cities.*
1. Local organizations, alphabetical or chronological list and secretary's minutes if printed proceedings do not exist.
 2. City boards of pharmacy, their published reports or secretary's minutes.
 3. List of journals published, etc.
 4. List of colleges, etc.
 5. List of manufacturers.
 6. List of jobbers.
 7. List of retailers from city directories, etc.
 8. Monographs.
 9. Special papers.
 10. Museums and libraries.
- C. *Biographies.*
- Alphabetical list. Titles under each to be arranged in order of publication with reference to journal or proceedings.
- D. *Histories of Individual Drug Stores, with Photographs.*
- Alphabetical list. Titles and place of publication.
- E. *Miscellaneous, e. g.,*
Scrap books, etc.

The work on this bibliography has already begun. Professor Lloyd has promised a list of titles of scientific treatises by American authors, to be prepared, if possible, during the next year, by the librarian of the Lloyd library. In the course of time, this list is to develop into a complete bibliography of the subject. Professor Lloyd has also promised for this meeting a paper on "The Founding of the Lloyd Library."

With the aid of a list of colleges, schools and departments of pharmacy compiled by Professor Scoville as Secretary of the American Conference of Pharmaceutical Faculties, your Chairman has made an effort for complete files of catalogues. Responses with mostly partial files have already been received from a number of institutions. It is remarkable to learn how many of these institutions have no complete files themselves. Certainly it is time for some organization to collect what may yet be had and to place these important documents in a safe place where they may be consulted by the future students of American pharmaceutical education. As soon as the work of collection has progressed sufficiently, a bibliographic account of these catalogues will be attempted.

Thus far catalogues have been received from the following institutions:

- Albany College of Pharmacy (N. Y.).
- Baylor University, Dallas, Tex.
- Buffalo College of Pharmacy (N. Y.).
- Cleveland School of Pharmacy (Ohio).
- Keokuk College of Pharmacy (Iowa).
- Medico-Chirurgical College, Philadelphia, Pa.
- North Dakota Agricultural College, Fargo.
- Northwestern University, Chicago, Ill.
- Oregon Agricultural College, Cornwallis.
- Purdue University, Lafayette, Ind.
- Scio College of Pharmacy (Ohio).
- Shaw University, Raleigh, N. C.
- Temple College, Philadelphia, Pa.
- Tulane University, New Orleans, La.

University of Iowa, Iowa City.
University of Minnesota, Minneapolis.
University of Oklahoma, Norman.
University of Texas, Galveston.
Vanderbilt University, Nashville, Tenn.

Some months ago your chairman made a special plea for the preservation of commercial catalogues.* This was followed by a circular letter to a number of manufacturers and jobbers who have been more or less identified with this Association for a number of years. Here also the returns were but imperfect; only one firm could send a file of its annual catalogues for somewhat more than a decade. However, the spirit manifested was very encouraging, for several firms promised to advertise for copies of their older catalogues and to send them as soon as obtained.

Catalogues and other publications have been received from the following firms: McKesson & Robbins, Schieffelin & Co., Parke, Davis & Co., Sharp & Dohme, Wm. R. Warner & Co.

In the line of biography, a beginning has likewise been made. Toward the close of last year letters, with circular for publication, were sent to twenty-two journals requesting the pharmacists of this country to send letters of deceased members of our profession who have rendered conspicuous service to American pharmacy. Mr. Ebert has promised to take charge of Procter letters, Mr. Wilbert, of such written by Professor Maisch, and Miss Adelaide Rudolph, of Cleveland, of letters by the late Dr. Rice. As a result of this effort, three letters were sent to the chairman, one each by Mr. Ebert, a Squibb letter by Mr. La Seur, of N. M., and a Rice letter by Professor Wulling. However, this work has been more satisfactory than the results of these circulars would indicate. Those who are in a position to collect letters and are willing to do so will, upon application, be supplied with paper and covers of standard size.

In closing his report, your chairman desires to express the wish that all members of this Association who are willing to do work along any of these and other lines may not hesitate to express their willingness to do so. The collection of material as historic documents is one of the most important things we can do at present to further the study of the history of American pharmacy. Every one with but a little time and inclination can assist materially in doing this important work.

The Chair called on Mr. Sheppard, of Boston, to exhibit a scrap-book he made in 1875.

Mr. Sheppard exhibited and explained the contents of a book which he said belonged to the Boston Druggists' Association, but which it would gladly donate to a pharmaceutical museum, if one should be established under the auspices of this Association. It was made when he was Local Secretary of the meeting of the American Pharmaceutical Association that year, and it was an absolute history of that meeting from the standpoint that it gave what was not to be had from the Proceedings or in any other way. Mr. Sheppard then went into a detailed account of the contents of the book.

The Chair stated that many of the papers to be presented this evening were in the nature of object-lessons, and would give valuable suggestion to

* Bulletin of Pharmacy, 18, p. 238.

the members as to what might be accomplished in this line of work. He hoped future Local Secretaries would follow Mr. Sheppard's example, so as to preserve in this form a vivid picture of the meetings of the Association.

Mr. Whelpley was then called upon to present a line of A. Ph. A. pictures he had taken at various meetings, and the Chair expressed the hope that others who had taken such pictures would present duplicates of their work, or the originals, to the Historical Committee, as Mr. Whelpley had done. Mr. Whelpley first exhibited a volume entitled, "Golden Jubilee American Pharmaceutical Association, 1902," as being particularly appropriate to follow Mr. Sheppard's scrap-book. He said he was especially interested in the St. Louis meeting in 1901, when he was Local Secretary, and the Golden Jubilee meeting in Philadelphia the following year, and had preserved everything written or printed in regard to these two meetings. The matter he had preserved occupied a space of three feet in each direction, or nine cubic feet, and was largely in excess of the space demanded in 1875, when Mr. Sheppard was Local Secretary, which was largely due to the increase in number of the pharmaceutical journals and the amount of space they now devoted to the meetings of the Association as compared with former years. He went on to say that he had not missed a meeting since 1885, and had not failed to have his kodak with him since 1889, and that this small but inseparable companion was responsible for the large number of pictures in an album that he would now show the members. He thought if other members would take such pictures and paste them in a scrap-book that the Association would furnish, it would surprise them how the collection would grow. In this connection Mr. Sheppard suggested that the name and date should always be put on them. Mr. Whelpley exhibited his interesting album of photographs.

The Chair called on Mr. A. E. Ebert, as the authorized collector of the correspondence of William Procter, Jr., the Father of American Pharmacy, to state the result of his effort. Mr. Ebert said he had eighteen letters of Prof. Procter, most of them written to himself, and pertaining in the main to matters affecting the Association and the Chicago College of Pharmacy, in which he was very much interested. He also exhibited some letters of John M. Maisch that he had collected, which he supposed should be turned over to Mr. Wilbert; also letters of Edward Parrish, Trimble, Bedford, Squibb and Rice; likewise, of Geo. W. Sloan and W. S. Thompson. Mr. Ebert then proceeded as follows to give some of his recollections of Prof. Procter:

Procter was an unusual man. He was very careful of his friends. My association with him dated from my college days in 1862, in Philadelphia, to the time of his death. He had an unusually kindly feeling for this Association. Whenever he found a stranger at one of our meetings—in those early days of the Association, we did not have as many strangers

present as we do now—he would not wait an for introduction, but would go and meet him pleasantly, and ask him his name and where he was from. He had a happy way of introducing him around and making him feel at home, and he would try without delay to get him to promise to write something for the next year's meeting, perhaps. The work that he did for this Association can hardly be appreciated, except by those who came in contact with him. It was, so to speak, a dear child of his. We old pharmacists who knew him can never forget his goodness of heart and the interest he took in pharmacy. He seemed to live to see how much good he could do for pharmacy.

The Chair stated that, in connection with the collection of letters and this biographic work, he wanted to call attention to a standard size paper holder which had been adopted for the purpose, fortified so that it would receive letters of double or quadruple thickness, if necessary, and arranged with loose leaves, so that the material could be finally put in chronological order. Samples were exhibited to the members.

The Chair announced that Mr. Wilbert had promised to take charge of the Maisch letters, and asked the members to hunt up and pick out such as they thought ought to be preserved—especially those which would throw any light on the past history of the Association or of American pharmacy. He also asked that those who knew Maisch, or were taken back into the spirit of the past in going over these old letters, would write out their recollections of the man, or their impressions gathered from their correspondence with him. They could do an important work in this way—in some cases more valuable than the mere collecting of letters, although that was all-important, too. The Chair also stated that Miss Adelaide Rudolph, of Cleveland, who had done considerable work in connection with the Rice Memorial, had taken charge of the Charles Rice letters, and he invited those who had such letters to forward them to her. He said he had some matter relative to Curtman himself, which he would be glad to turn over to some St. Louis man who would undertake the collection. He also had a letter of Prof. Trimble, which he would be glad to turn over to some student of his who would agree to work up his correspondence, or gradually work up a biography of a man who had done so much for scientific pharmacy. In answer to a question by Mr. Sheppard, the Chair stated that nobody had undertaken the Parrish letters as yet.

The Chair then called for the reading of a paper by Mr. Hancock on the subject of William Procter. Mr. Hancock, before reading the paper, stated that he had some letters from Maisch and two from Procter; also some from Israel Grahame, and perhaps some others, but he had not had time to go over his papers. He regretted exceedingly that he had not taken a picture of the house in Baltimore where Prof. Procter was born, upon an occasion during a meeting of the Association when he went with Prof. Procter, Prof. Moore and William Simpson to visit the place. It was

a stone house on Cathedral street, which has been torn down since and replaced by a much larger building. Mr. Hancock then proceeded to read his paper, which he said was one of a series, some of which had already been presented :

WILLIAM PROCTER, JR.

(The Father of American Pharmacy.)

BY JOHN F. HANCOCK.

For many years before the advent of William Procter, Jr., the condition of pharmacy in America was unorganized and without a leader to give it direction. There had been some few men in its ranks from foreign lands who were more advanced in thought and purpose than the others ; but as an educator and as a systematizer (in the highest sense a scientist), one upon whose shoulders the mantle of professionalism could rest in strict propriety, there were none who might be compared to the modest, earnest and sincere man of American birth—William Procter, Jr.—the ninth and youngest child of Isaac Procter, a hardware merchant of Baltimore, who came from England in 1793, through the advice of his relative, Lindley Murray, the grammarian. William Procter, Jr., was born in Baltimore in 1817, and his father died in 1820. Although a very reputable man, Isaac Procter was not rich, and his widow did not have the means to afford her children liberal educations.

William, however, from his early years was a close observer, and very studious, and he embraced every opportunity to learn, and made much progress in his studies. Being of an inquiring mind, he was soon attracted by scientific questions, and in youth established and developed those qualities that made him a peer in his chosen work. At the age of 14, he visited a friend in Philadelphia, Joseph C. Turnpenny, who was in the employ of Henry M. Zollickoffer, a reputable apothecary of that city. During this visit he became interested in chemistry and pharmacy, and apprenticed himself to Mr. Zollickoffer to learn the business. From that humble beginning, like Faraday with Sir Humphry Davy, he rose to be the superior of his master. He matriculated as a student in the Philadelphia College of Pharmacy, from which he was graduated in 1837, one of a class of eight. The theses of four of that class were published in the American Journal of Pharmacy, and that of William Procter attracted especial attention for his originality in the investigation of *Lobelia Inflata*, which he afterward enlarged upon and made a matter of pharmaceutical history. In the same edition was also published his investigation of Wild Cherry Bark, in which he described an oil procured by distillation, that had been first noticed by Stephen Procter, an English chemist.

His colleagues of the graduating class ceased to attract further attention as investigators or writers, but William Procter, Jr. continued with increasing interest and fidelity of purpose to the year of his death, 1874.

A reference to the pages of the American Journal of Pharmacy and the Proceedings of the American Pharmaceutical Association will illustrate the usefulness to all pharmacists, of the life of this great and good man. He has left to them a richer legacy of knowledge and professional deportment than has been the result of any other pharmacist of this country, and it is deserving that his memory and labors shall be honored by a monument to the honor of American pharmacy.

When William Procter, Jr. graduated from the Philadelphia College of Pharmacy, the chairs were occupied by physicians who continued their lectures to pharmacy students for some years after. During this time young Procter was quietly, systematically and unostentatiously working his way to the front. In 1846, his ability was recognized by his associates in that college, and the Board of Trustees elected him Professor of Pharmacy. In October, 1847, he delivered his introductory lecture, which was published in the American Journal of Pharmacy, at that time the only organ of pharmacy in America. The moral and intellectual tone expressed in this first address will always remain a credit to its author. Other pharmacists had preceded him as lecturers on pharmacy, but none of these had persevered to the same extent. David Stewart, Thos. G. Mackenzie, Benjamin Rush Roberts and George W. Andrews had been elected teachers in the Maryland College of Pharmacy in 1841, but they soon resigned their positions for personal demands of their respective shops.

In 1791, an accomplished French pharmacist, fleeing from the massacre at Santo Domingo, came to the United States and settled in Baltimore, Md., where he established himself in business and was eminently successful. When the city of Baltimore was incorporated in 1796, Edmund Ducatel was the representative pharmacist of the new city. Among the reputable men who learned pharmacy under this teacher, may be named Thomas G. Mackenzie, Benjamin Rush Roberts, Elias Durand, George W. Andrews, John Milhau and J. M. Laroque. Dr. Julian Ducatel, a son of Edmund Ducatel, was the Professor of Medical and Pharmaceutical Chemistry in the Medical School of the University of Maryland for several years. His successor was Dr. Wm. R. Fisher, a graduate of the Philadelphia College of Pharmacy. He was elected to succeed Dr. Ducatel in 1837, and was at the time a member of the pharmaceutical firm of Tyson & Fisher, of Baltimore. He afterwards returned to Philadelphia as a teacher at his alma mater, and later studied for the ministry. Others might be named who have been elevated to high positions in pharmacy, but the list will not show one who was the equal of Procter in patience, perseverance, endurance and unselfish devotion to his calling.

When he entered pharmacy as an apprentice, it was his aim to thoroughly learn the science and art of his chosen vocation, and after he had mastered its difficult problems, it was his highest ambition to conduct it as an honorable profession. For him there was no need of a printed

code of ethics ; his every action was an exemplification of ethical conduct. As an investigator, writer and teacher, he was ambitious to learn the truth, which he freely and honestly imparted to others. With him, no bond could be more binding than his word, and though a quick and careful observer, he never degenerated to the tricks of trade for material gain and compensation. In his dealings with men, he was considerate, but always frank and honorable, and this is the monument inscribed on the tablet of memory of those who knew him personally.

Of the few personal friends now left, who will soon follow him to the beyond, some would take pleasure in assisting to erect a monument of bronze to perpetuate his memory for all time, and to honor the purity of American Pharmacy, for which he gave the best efforts of his life.

When William Procter was graduated from the Philadelphia College of Pharmacy, he dedicated his services to the honor of his alma mater, and his work for its prosperity is very largely the matter of its history. In 1851, when the delegates from the College of Pharmacy met in the city of New York, pursuant to a call from the New York College of Pharmacy, William Procter was present, and he was the most important factor in the organization of the American Pharmaceutical Association, the outgrowth of that meeting. From that time on to the close of his life, he held the post of duty and contributed in many ways to its success at every annual meeting. The Annual Proceedings testify his worth and faithfulness to this Association. When he was made Editor of the American Journal of Pharmacy, the same devotion and labor were bestowed upon that work, and the character of the Journal and his valued contributions to its pages made it the leading Pharmaceutical Journal of America.

While he did not have equal educational advantages with the average student of to-day, he was able to remove difficulties and surmount obstacles by his mild courage in the face of strong opposition. His nature was gentle, sympathetic and kind, and he was ever ready to extend a helping hand and to speak words of encouragement. To be in his presence was to be an inspiration.

So lasting is the memory of this good man, with those who knew him best, that 27 years after his death his successor in the Philadelphia College of Pharmacy presented a thoughtful and carefully-prepared memorial address, which was read at the forty-eighth annual meeting in Richmond, Va., and published in the Proceedings of 1900. The last meeting attended by Prof. Procter having been in Richmond, in 1873, this address by Prof. J. P. Remington, and the obituary in the Proceedings of 1874, should stimulate the minds of our members to review the published works of this man of the past century to whom we are so much indebted. This alone should secure a monument to his memory.

During the present year the Congress of the United States paid a beau-

tiful compliment to civilization. This Congress of the United States appropriated \$8,000 to place headstones, with the names so far as is known, to the Confederate dead in Arlington Cemetery, near the city of Washington, D. C., which was approved by President Roosevelt. It is doubtful if any other nation on the face of the globe would so honor those who had taken up arms against their government.

Another event at the National Capitol of more personal interest to the members of this Association occurred on the 11th of June, 1904, when there was unveiled a monument with a bronze statue of Dr. Benjamin Rush, one of the signers of the Declaration of Independence, and an eminent physician of Philadelphia, who no doubt had a pharmacy attached to his office, as was the custom in his day. This monument is on the grounds of the old Naval Observatory, and was erected by the American Medical Association at a cost of \$15,000. The President of the United States, in his address of acceptance, said: "I accept, on behalf of the Nation, the gift so fittingly bestowed by one of the great professions, this statue of a man who was eminent in his services to the Nation as a whole. Here at the National Capitol it is earnestly hoped that we shall finally see commemorated, as the services of Rush are henceforth to be commemorated by this statue, all of the great Americans who, working in widely different lines, by the aggregate of their work make the sum of achievement of America in the world. I thank and congratulate you of the medical profession upon what you have done, not merely in commemorating the foremost pioneer in your profession, but in adding at the National Capitol a figure to the gallery of great Americans who should here be commemorated."

More than twenty years ago the American Medical Association appointed a committee on the Dr. Benjamin Rush Monument Fund. The work has been fully accomplished. During that time all but one of the original committee of eight have died.

We do not believe so long a time will be required to erect a monument with a bronze statue of William Procter, Jr., and we are convinced that the time has come when this should be undertaken. It is earnestly hoped that the Association will appoint at this meeting a committee on the William Procter, Jr., Monument Fund, and at the proper time a preamble and resolution will be presented for the appointment of said committee.

Following his paper, Mr. Hancock proceeded to read a set of resolutions passed at the last meeting of the Maryland Pharmaceutical Association, urging the American Pharmaceutical Association to raise money to erect a suitable monument to Procter in the Smithsonian grounds at Washington, pledging the support of the Maryland Association to the work. He said Congress would no doubt aid in this work, as in the case of the Gross monument, erected by the surgeons of the United States. He said he expected to introduce proper resolutions at another session.

The Chair called for the presentation of a paper by Mr. W. O. Richtman, of the Government Service, on the cultivation of the opium poppy in the United States, and the author presented the following abstract of his paper, with explanation of a number of charts or maps tacked up before his audience, illustrative of the different sections and comparative areas where the cultivation of this plant had been essayed in this country :

THE CULTIVATION OF THE OPIUM POPPY, *PAPAVER SOMNIFERUM*, L.,
AND THE PRODUCTION OF OPIUM IN THE UNITED STATES.

BY W. O. RICHTMANN.

The production of opium in the United States was recommended as early as 1764, and accomplished in 1788. The production of opium in this country has been looked upon with general favor by the agricultural, medical and pharmaceutical press. In a few instances only are objections urged to the developments of the above industry. Those who have studied the conditions necessary for the production of opium as a rule, believe that it cannot be done profitably.

The experiment has been tried in practically all of the states east of the Mississippi River. Maine and Indiana are the only exceptions. In Minnesota, Texas, California and Washington, west of the river, trials have also been made. These experiments have been conducted on small and large scales. In some instances, only a few plants were grown in a flower garden, while in others, several acres of the plant were cultivated. In the latter case, instances are reached where the opium produced has been sold with and without profit.

No data are available as to the quantity of opium that has been produced in this country. The quality is recorded in statements of the physiological action of the opium, and in the later experiments, by assays of the morphine content. These assays report that the morphine content ranges between six and fifteen per cent.

These experiments have been conducted with more or less regularity, year by year, for more than a century.

The periods of greatest activity are found when the country was engaged in its several wars, with the exception of the Mexican and Spanish-American Wars, when conditions were such as to cause no interference with the importation of the imported product.

The opium poppy has also been cultivated for its seed, and the oil of the seed.

In many of the above experiments various suggestions have been tried to facilitate the collection, improve the quality or increase the quantity of opium produced. All have resulted with very indifferent success.

Mr. Ryan said a firm in Detroit had submitted to his establishment in the last month a sample of opium from Oregon or Washington, as he re-

membered, which assayed about seven per cent. of morphine, and they wanted to sell it to his house. The sample was all right, but he did not know whether the product was or not.

Mr. Pettit wanted to know if the Confederate records showed anything on the subject of opium in the South. He had himself dispensed both morphine and opium of Southern manufacture, the morphine as good as you would ordinarily get, while the opium assayed not more than five per cent.

Mr. Richtman said he had tabulated all the assays made up to the present time, from zero up to 15 per cent., and the average was below what was considered a good quality at the present time—that is, moist opium.

The Chair expressed pleasure to know that pharmacists in the government employ were not only willing to do their work well technically, but had the broad spirit to look at these matters from a historic point of view as well as scientific.

The Chair called on Mr. Knox to read a sketch of the Phi Chi Fraternity, and that gentleman, prefacing his paper with the explanation that he had not begun to collect his material in time, and was only able to present an outline of his subject, read the following :

HISTORICAL SKETCH OF PHI CHI FRATERNITY.

BY J. W. T. KNOX, OF ALPHA CHAPTER.

For many years Greek letter societies have flourished at the University of Michigan, playing an important part in the student life of that institution, promoting class and college spirit, and figuring largely in the social life of college and town. Although this is true of many eastern universities and colleges in no less degree, the secret society idea has been popular at Ann Arbor to a greater extent than in most other institutions of the kind in the West, and there are now, I believe, between forty and fifty chapters of fraternities and sororities there.

In such an atmosphere it was to be expected, it was even inevitable, that the students of pharmacy should be influenced to undertake the formation of a society along similar lines, especially as it was and is the custom of fraternities there to observe organic divisions of the University, and restrict membership chiefly to students of a single department ; there are, therefore, literary, law and medical fraternities, and thus it happened that in the early autumn of 1883 the first pharmacy fraternity, Phi Chi, sprang into being at the first university school of pharmacy, Michigan.

In its beginning, however, the organization was not secret, but partook almost entirely of the nature of a students' scientific society before which papers were read and discussed by the members ; at this time it was known as the Phi Chi Society, but after a few meetings were held the fraternity feeling became so strongly felt that it was reorganized with the same membership into the Phi Chi Fraternity, Alpha Chapter, with a new

constitution and by-laws, a ritual, passwords, emblems, regalia, etc., and so it has continued.

The charter members, or as they are sometimes called by the members, Fraternity Fathers, were Llewellyn H. Gardner, President; A. G. Hopper, Secretary; F. H. Frazee, Charles E. Bond, Charles F. Hueber, A. S. Rogers, Azor Thurston, A. T. Waggoner, C. P. Godfrey, A. G. Hoffman, G. P. Leamon. Of these, Gardner, Hoffman and Leamon are deceased. The remaining eight are engaged in pharmacy with the exception of C. E. Bond, who is a manufacturer of fertilizers at Spencerville, Md., A. S. Rogers who is now a successful physician at Bay City, and C. P. Godfrey, editor of the *Ottawa, O., Gazette*, and member of the Ohio Senate. F. H. Frazee is in manufacturing pharmacy, at Boston; A. T. Waggoner at Topeka, Kansas, Azor Thurston at Grand Rapids, O., C. F. Hueber at Port Huron, Mich., and A. G. Hopper at Alpena, Mich., are conducting retail stores with more than ordinary success.

An impression exists that Dr. A. B. Prescott, the beloved dean of the School of Pharmacy at Ann Arbor, is the founder of the Fraternity, and it is correct to the extent that it was at his suggestion that the organization was formed and with his approval that the change from society to fraternity was made. He was the first to be elected to honorary membership, and during the twenty-one years of Phi Chi's existence the evidences of his kindly interest have ever been at hand.

From 1883 to 1895 the life of the Fraternity was uneventful. Through varying degrees of prosperity, and some adversity, it came to the second stage of its existence, the era of expansion. In the spring of 1895 the Phi Chi Fraternity was regularly incorporated as such under the laws of Michigan, and it was definitely determined by unanimous vote of the active members, after careful consideration, to authorize the establishment of other chapters at other schools of pharmacy of high standing. This was a radical departure—almost as much so as the change at the beginning from society to secret fraternity—since in previous years the sentiment was to the effect that Phi Chi should remain, as it began, a purely Michigan institution.

The change from a local to a national organization necessitated a thorough revision of the constitution and by-laws, a duty which was delegated to a competent committee, composed for the most part of men of extended experience in secret society work; the same committee re-wrote the ritual, eliminating features that had lost their significance, adding new work, and in all, making the ceremonies, when properly conducted, unquestionably impressive.

The first application received under the new constitution was from the School of Pharmacy of Northwestern University, which was approved by Alpha, of Ann Arbor, and Beta Chapter was swung out by a committee sent from Ann Arbor, January 6, 1896.

New York College of Pharmacy next applied, as a result of correspondence conducted with Ann Arbor men by Caswell A. Mayo, editor of the *American Druggist*. This also was acted on favorably, and the chapter duly installed as Gamma.

The establishing of Delta at the Pharmacy Department of the University of Wisconsin, Feb. 12, 1900, followed, and with this the supreme authority passed from Alpha into the Grand Council, consisting of two men from each chapter, as provided by the constitution.

About a year later Epsilon Chapter was instituted at the Philadelphia College of Pharmacy.

In April, 1902, the local fraternity of Phi Delta Alpha at the California College of Pharmacy became Zeta Chapter of Phi Chi, and very soon afterwards Eta was established at the Massachusetts College of Pharmacy, thus uniting pharmacy students in the extreme west with those of the extreme east in bonds of brotherhood.

A journal, "The Phi Chi Communicator," is published with "cheerful irregularity," and is circulated exclusively among the active and alumni members. Its present editor is Mr. F. C. Hitchcock, Alumni Secretary, New York City.

The fraternity motto is "*Alterum alterius auxilio eget*," which is freely rendered, "Each helps the other." Its emblem, the Greek letters of its name superimposed on the equilateral triangle, vertex down. The colors are old gold and dregs of wine.

In every school of pharmacy where Phi Chi is represented, so far as I am aware, it has the respect and confidence of the Faculty. As a fraternity it strives to bring about good fellowship among its members, to stimulate them to the performance of the best class and laboratory work of which they are capable, and to imbue them with the strongest loyalty to Alma Mater. And thus the Phi Chi Fraternity as a whole is a factor of no small importance in college life both to students and to the college, for its aims and purposes are beneficent to both alike; its influence is elevating, and the standing of its active and alumni members in the pharmaceutical world leaves little room for doubt of the degree of success with which its ends are achieved.

The Chair said it would doubtless be news to some of the older members to know that there was such a thing as a "Greek Letter Society" in pharmaceutical circles.

Mr. E. J. Kennedy was then invited to give the result of some work he had done in the matter of collecting pharmaceutical directories and the like. Mr. Kennedy said his exhibit was delayed on the road somewhere, and he could not present his subject as he wished. He would say, however, that he had been collecting druggists' directories for several years past, and the collection, which was quite complete, covered some fifteen

or sixteen years. He also had several hundred college programs, some of them extending back perhaps twenty years, and some of the members would be surprised to see their names on them. He also had a number of articles contributed by Dr. Rice to his journal, the *Pharmaceutical Era*, on the history of the Pharmacopœia—very interesting manuscript written in Dr. Rice's own hand; but this, also, was in his delayed exhibit. He hoped to present the subject at some future time in a more satisfactory way.

Mr. Scoville then exhibited a price-list of the Massachusetts College of Pharmacy, of date 1854. He said that for forty years the time of the organization was largely spent in discussing prices; that it had attempted to start a school, but did not succeed until it had held together all these years. This list was based on the Pharmacopœia of 1850, and embraced the entire Pharmacopœial list, with prices. This particular copy of the price-list in question was presented by a man who has been in business for sixty odd years in the place where he began—and has never cut prices. Mr. Sheppard made the comment that when he went into the drug business in Salem, in 1858, this little book was the standard of prices all over his section of the country, and was as much their bible in the store as the Bible was in the Sunday-school.

The Chair stated, inasmuch as the National Association of Retail Drug-gists was not likely to establish an historical section he would ask others having such price-lists to bring them to this committee. He knew of such a list from Milwaukee, of date of 1870, but had not been able to get hold of it. Mr. Kirchgessner said he had a Grand Rapids list he would contribute.

Mr. Wilbert was asked to present his paper on the beginnings of pharmacy in America, with lantern-slide illustrations. Mr. Wilbert said he thought it might be well to give an abstract of his paper first, as it was really in two sections, the lantern slides being intended not only as illustrative of his paper, but also of a particular phase of the work done by the committee in taking copies of all photographs, woodcuts and advertisements relating to the history of pharmacy. Mr. Wilbert then proceeded to abstract his paper, and followed it later on in the session with an interesting series of lantern-slide portraits of the first physicians to take up the subject of medical education in this country, as well as pictures and views illustrating the early history of the Philadelphia College of Pharmacy, as well as the School of Pharmacy of the University of Pennsylvania, which preceded the establishment of the first-named institution.

The Chairman then proceeded to read the remaining papers by title. One was a paper by John U. Lloyd, on the Founding of the Lloyd Library; another was on the Drugs of Primitive Peoples; another on the Rites Observed in the Collection of Camphor by the Borneo Head-Hunters; and another on Pharmaceutical Notes. There was also a collection of Documents on the Irving Drug Law, compiled by Dr. Hoffmann.

The Chair stated that the Committee had endeavored to present the possibilities of the different lines of historic work, but they were by no means exhausted, and he trusted the members would take up the work of this character. Mr. Whelpley agreed to take up the matter of collecting the Curtman letters.

Mr. Whelpley said that, as a St. Louis man, he would be glad to take up the work of collecting the Curtman letters. Mr. Wilbert said he had seen Mrs. Maisch just before starting for Kansas City, and she would be willing, ultimately, to turn over to the Association all of the material still in her possession, provided a safe place is secured to properly exhibit and care for these (to her) sacred memorials. He then went on to pay a tribute to the sterling character of Maisch and his great ability as a pharmacist, but lamented that he had been quite unsuccessful in making a collection of his letters, and urged those who might have such letters to forward them to the Historical Committee. He had, however, succeeded in collecting some Maisch literature, and had secured some delightfully written reminiscences of him, and would be glad to get other contributions of this character.

Mr. McIntyre told of the time when Prof. Procter had *prescribed* for him in a way he should never cease to be thankful for. He impressed upon him the desirability of attending the meetings of the American Pharmaceutical Association, and, though he was in declining health at the time he acted on the advice thus given and went to the St. Louis meeting in 1871, and the "prescription" was effectual in the restoration of his health. He said he had brought a part of the prescription to this meeting with him in the shape of an invitation (which he exhibited) by the local druggists of St. Louis to a banquet at the Southern Hotel, one of the items of the *menu* of which, *buffalo tongues*, would indeed be a great rarity in these days.

Mr. Sheppard said he did not think the committee should adjourn without taking some action looking towards a permanent organization. He referred to the plan which had been recommended in the President's address, but said it would not be reported on until the last general session, and he thought something ought to be done now by way of expressing an opinion or making some recommendation to the final general session.

Chairman Kremers said he had recommended in his report that permanency should be given to this work by changing the committee into a section, with a Chairman and Secretary to be elected annually, as in the other Sections. He thought this a matter of prime importance. If, in addition, the Association should see fit to give continuity to certain aspects of the work, such as correspondence and the collection of biographical material, it might be well to add as associate on the Committee an Historian. There should be not merely a report, but a historical address by the Chairman, and both Chairman and Secretary should be changed each year, so as to have the benefit of new ideas and new work.

Mr. Sheppard thought the idea of having a permanent Historian was an excellent one, as insuring continuity to the work, and thought he should have a seat in the Council, if necessary.

Mr. Whelpley thereupon moved that the Chairman of this committee be requested to confer with the Committee on President's Address, and discuss with that committee the recommendations of the President pertaining to this work, so that the entire matter might come before the Association in concrete form. Mr. Sheppard said this suggestion was agreeable to him. Mr. Hancock seconded the motion, and it was put and carried.

Mr. Ebert expressed the hope that upon organization of the committee along the lines contemplated there would be a local historian appointed in every part of the country to collect data concerning the history of the drug trade in his particular locality. This could be done readily, and abstracts could be furnished the Historical Section to form the basis of a future history of the drug trade of the country.

After Mr. Hancock had indulged in some reminiscences of the early days of the drug business in Baltimore, the Chairman called attention to the fact that Dr. Hoffmann was willing to turn over certain valuable documents in regard to pharmacy in this country, provided proper arrangements could be made to take care of them at Washington. Secretary Caspari said he was just about to bring this matter up and ask the appointment of a committee to take the matter in hand. He said the Smithsonian Institute was very favorably inclined towards the American Pharmaceutical Association, and he thought it would not be difficult, unless the rules prevented, to arrange for the necessary space there for such collections, and if it could not be arranged there, it probably could be at the National Museum. The idea was to make a depository of all the archives of the Association until such time as it could take care of them properly itself. The motion to appoint a committee to confer with the authorities at Washington with reference to the establishment of a pharmaceutical museum was then put and carried.

Secretary Caspari said it was desirable that some action be taken in regard to the disposition of the papers that had been presented to the Committee, and the acceptance of the report of the Committee, and he would move that the report of the Committee be accepted with thanks, and that the papers which had been presented and read, either by title or in abstract, be referred to the Publication Committee, which motion had a second in Mr. Eliel and was carried.

Mr. Hancock moved that when Mr. Wilbert had given his lantern-slide exhibit, the Committee should stand adjourned, and the motion was seconded by Mr. Eberle and carried.

Mr. Wilbert then gave the exhibit heretofore referred to in connection with his paper, and, upon motion of Mr. Lemberger, received the thanks of the Committee.

THE FOUNDING OF THE LLOYD LIBRARY.*

JOHN URI LLOYD.

The founders of the Lloyd Library, John Uri Lloyd (born 1849), and Curtis Gates Lloyd (born 1859), were reared as boys in Boone County, Kentucky. Their parents were school teachers from North Bloomfield, New York, who in 1853 moved to that section of Kentucky, the father engaging in railway engineering, which was a part of his vocation. The immediate cause of his moving to Kentucky was the surveying of a railway line between Covington and Louisville, the family locating at Burlington, Boone County, near the line of survey.

When the older of the boys reached the age of fourteen (1863), he was apprenticed to the pharmaceutical firm of W. J. M. Gordon & Bro., in Cincinnati, the object being the learning of the drug business. After his period of apprenticeship expired, he was again apprenticed to George Eger, opposite the "Mohawk Bridge," on Central Avenue, in what was then the German section of Cincinnati, the object being the learning of the German phase of the prescription business. After this apprenticeship expired, he returned, as prescription clerk, to the employ of O. F. Gordon, Eighth and Central Avenue, the firm of Gordon & Bro. having, in the meantime, dissolved, and O. F. Gordon retaining the apothecary business. In this store the young apprentice had previously made the acquaintance of Professor John King, M. D., the author of the American Dispensatory, whose practice, both at home and by consultation, was large, and who now gave into Lloyd's special hands the making of all his prescriptions. It was here that, in 1870, at Professor King's request, his first contribution to pharmacopœial literature was made, through the Eclectic Medical Journal, in 1870, the subjects being:

Simple Syrup of Stillingia and Compound Syrup of Stillingia (p. 460), and Ointment of Bittersweet and Compound Syrup of Hoarhound (p. 530). In connection with this it may not be amiss to copy the introduction to these articles by Professor King (pp. 435-6)).

"I have not been fully satisfied with several of the formulæ, given in my Dispensatory, of some of our most valuable compounds, and which will require some slight changes in order to procure reliable preparations, of full strength. In practice, I have found some of them to fall short in their action, not producing the effects that should be expected from their administration, while others form very turbid compounds, more or less subject to change, and sometimes quite unpalatable. With a view to obviate these difficulties and present formulæ by which even the less skilled may succeed in making good medicinal compounds, I have engaged a young man who is a talented and skillful pharmacist, Mr. J. U. Lloyd, now in Mr. O. F. Gordon's drug store, to experiment with

*This paper is the result not only of a personal request, but because most visitors at the Lloyd Library request the Librarian for just such information as is herein conveyed. The historical data have been brought together by the only person in a position to give these facts.

these unsatisfactory preparations and ascertain what improvements can be made therein. The results of his experiments will be published from time to time, in the Eclectic Medical Journal, so that our druggists may be enabled to repeat his processes, and, I hope, report their success or unsuccess to me at as early a period as possible."

JOHN KING.

Finally, (1879), under the personal request and arrangement made by Professor King and Dr. John M. Scudder, the young man arranged to take charge of the laboratory of H. M. Merrill & Co., agreeing to devote his time and care to the subject of the Eclectic Materia Medica and its preparations. It was found that the literature in this direction was very much scattered, and in order to acquaint himself with the record of the past, it was essential that he should obtain for reference a complete file of the standard Eclectic publication known as the Eclectic Medical Journal, together with its antecedent (seven volumes, 1836 to 1848) of the Western Medical Reformer. A systematic search for these volumes was instituted, the result being that on its completion it was found that so many references were made to out of-sight works of the early Eclectics, both in serial and in book form, as to render it necessary that these also should be in hand. A search of the United States for literature connected with these problems followed. In this search, advertisements were carried in the Eclectic and related current journals of the day, physicians of the olden times were personally solicited, and the second-hand book-stores were continually watched, the aim being, as has been said, to place the investigator in a position where he could creditably serve the interests of the Eclectic School in Medicine which, as is well known, had from its incipency made a specialty of American drugs and the products of American plants.

About this date the younger of the two brothers, Curtis Gates Lloyd, came from Kentucky to Cincinnati and engaged in the prescription business with a painstaking pharmacist, Dr. Johnson, at the corner of Elm and Ninth Streets, where he was located when he afterwards passed the examination before the Cincinnati Pharmaceutical Examining Board, and received a certificate as a pharmacist. His inclination being towards botany, after affiliating himself in business with his brothers, the same reason that had led his eldest brother to sacrifice both time and money for the purpose of obtaining a special line of publications that would enable him to do his work creditably, led the younger brother to begin a like collection concerning American Botany. This field broadened, and soon he found himself searching the literature of outside countries for special publications bearing on the subject of early American botanical history, especially that portion connected with drug products.

Thus it was that, without any thought of doing more than fortifying their own work and investigations in what was then largely an untrodden field, they together laid the foundation for this special library. As time

progressed, it was found that the field of research broadened and radiated in many directions outside the original line. Works in foreign languages became involved, as well as special treatises concerning investigations made in outlying countries, and finally the search for library literature included whatever concerned Botany, Pharmacy, Plant Chemistry or *Materia Medica* and Medical Practice in any country and in all languages.

In a short time, the section on botany and allied sciences dominated the field, outclassing the original collection, both as concerns numbers of volumes and financial investment.

It will be remembered that the founding of the plant was due to the necessity of investigating American drugs and Eclectic preparations. Be it recorded that the thoughtful members of the Eclectic School in Medicine, realizing the importance of such a collection to general medicine as well as to themselves, have ever taken a special interest in its evolution. They have generously contributed to its shelves such publications concerning early Eclectic literature as came to their hands. Professor John King before his death (1893), donated his entire library to its shelves. Professor John M. Scudder gave from his collection all that the library needed which he had not already donated to the Library of Congress. Dr. S. B. Munn, of Waterbury, Connecticut, Dr. Henry Wohlgemuth, of Springfield, Illinois, Dr. V. A. Baker, of Adrian, Michigan, Professor H. T. Webster, M. D., of Oakland, California, Professor H. W. Felter, M. D., the Eclectic Historian, and many others donated large consignments of pamphlets, miscellaneous journals and books. Indeed, it would be impossible to undervalue the many encouragements afforded by the members of the Eclectic School in Medicine, long before the library was known to the outside world. But although its founders moved quietly and self-sacrificingly, asking no general conspicuity, it was natural that scholars to be benefited should finally take an interest in what came to be their own cause. This is evidenced by the fact that physicians of all medical schools to-day recognize the helpfulness of the Lloyd Library, which is now thrown open to the world by act of incorporation, which makes it public to the uses of the world. Conspicuous members of all the schools in medicine appreciate that its contents, now free to all, are to be donated intact to the cause of education, and finally placed in the teaching institution in America where, as an impartial committee shall decide, the greatest good can be done to the greatest number. Members of the various schools in medicine and the pharmaceutical profession and of allied interests, the editors of the journals in pharmacy and medicine, authors of books bearing on the library field, are not only taking an active interest in its evolution, but are finding that even now its contents are invaluable to those who propose to make a special line of research in any direction whatever that concerns its province.

To recapitulate. What is known as "The Lloyd Library" is a plant

that was instituted for the purpose of enabling its founders to ply their vocation, pharmacy, better than could be accomplished without it. It is an outgrowth of the necessity for information concerning the American *Materia Medica* and the Eclectic preparations, which had become a special study of its founders. This restricted field widened, lengthened and radiated in different directions until the special collection of books and journals, which was the founders' aim, came to be but a fragment of the Library. From a library restricted mainly to the interests and usages of the brothers who founded it, and the service of the school in medicine that first gave it their helpful attention, it has grown to be a cosmopolitan collection, conducted by a professional librarian, with several assistants. It is systematically arranged, and embraces the entire subjects of Botany, Pharmacy, *Materia Medica*, Practice, Plant Chemistry, and affiliated Society and Academy Transactions. The first series of books completed for the library shelves was the Eclectic Medical Journal of Cincinnati, while the book to be considered as the initial volume is a little Bible that was placed in the valise of the older of the brothers by his mother when, as a boy, he left his Kentucky home in 1863, to engage as an apothecary's apprentice in Cincinnati.

The Historical Committee then stood adjourned.

IMPROVED PROCESS FOR SOLUTION OF MAGNESIUM CITRATE.*

BY EMILE BRUNOR, PHAR. D.

In view of the present revision of the United States Pharmacopœia, the writer would suggest a new method for preparing the solution of magnesium citrate so as to make it more palatable and stable.

As it is now, its most marked defect is the precipitation which occurs very often after the lapse of a few days. According to one authority this is caused by the presence of calcium salts in the magnesium carbonate used in the manufacture of the solution.

Another writer suggests that the solution be sterilized to prevent the growth of fungi, which are said to be the cause of this sediment.

Still another claims that if the bottles are not hermetically sealed, some of the salts will be thrown out of solution.

While these theories are plausible, they do not simplify a process which is still twenty years behind the times.

The writer has often observed that when the sugar, acid and the magnesium carbonate were mixed with hot water, so as to save time, the cold filtrate shows the presence of quite a large amount of grape sugar, which is probably formed by the inversion of the cane sugar employed. This is possible owing to the action of the citric acid on the sugar in the presence of heat.

The action of potassium bicarbonate has never been questioned, probably because it has never disappointed in carbonating, yet the tendency to use too much of it occurs, in which case it either creates a double decomposition or causes the bottles to burst.

The improvement suggested consists in preparing a concentrated solution of magnesium citrate, adding the simple syrup and filling the bottles with carbonated water. The following formula has given the best satisfaction :

R Magnesium carbonate.	15 Gm.
Citric acid	27 Gm.
Oil of lemon	1 gtt.
Simple syrup	60 Cc.
Hot water, q. s.	90 Cc.
Carbonated water, q. s.	360 Cc.

Dissolve the citric acid and magnesium carbonate in enough hot water to make 90 Cc. ; the oil of lemon is dropped on the magnesium carbonate

* This paper should have appeared in the Proceedings of the Section on Practical Pharmacy and Dispensing, but was overlooked because no mention of it was made in the Minutes, nor was it among the papers handed in to the Publication Committee.—
The Gen'l Secretary.

before it is added to the citric acid solution, and when the reaction is completed, filter.

This concentrated solution of magnesium citrate will keep for a month or more if it is kept on ice and in completely-filled sterile bottles.

To make a bottle of solution use 90 Cc. of the concentrate, add 60 Cc. simple syrup, then add a sufficient quantity of carbonated water, or so-called soda water, to make 360 Cc.

It is imperative that the carbonated water be very cold when poured into the bottles, as it is then fully charged and retains its pungency longer. The writer fills his bottles from the tap or draught of the soda fountain, that being the most convenient way. It will be noted that by dispensing with the potassium bicarbonate a saving of 3 Gm. of citric acid is effected, which also makes the product more palatable.

A finer flavor can be imparted to the solution by using the freshly-grated lemon peel.

As a novelty in aperient waters, the concentrated solution can be flavored with freshly-grated orange peel and sold as a laxative or orangeade, or a small-sized siphon can be filled with either flavor in the following manner: The air is exhausted in the siphon; a moderate vacuum is needed, such as can be produced by the mouth, and the concentrated solution mixed with the syrup is introduced by dipping the spout in the solution and opening the valve. The siphon is then filled with carbonic water in the usual manner.

It would be desirable to have this method introduced in the U. S. P. as an alternate process to be used by those pharmacists who possess a soda fountain.

ENTERTAINMENTS AT THE FORTY-SECOND ANNUAL MEETING.

The social features of the meeting were elaborate and varied ; reflecting much credit upon the generosity, hospitality and good management of the Kansas City pharmacists and the ladies assisting them. Delightful weather prevailed, and the many entertainments were thoroughly enjoyed by every one participating. Chairman and local Secretary, Joseph C. Wirthman, had thoroughly organized the Committee of Arrangements and had judiciously divided the work undertaken ; no one seemed overburdened, during the busy week, when so much was required of this competent officer and his willing and able assistants.

The ladies of the entertaining party were unusually well organized and were untiring in their gracious efforts to make everyone have an enjoyable time. While their lords were engaged with the affairs of the Association and the several Sections, special and, oftentimes, elaborate entertainments were provided for the visiting ladies, including : an informal reception on Monday ; a morning shopping party and afternoon social on Tuesday ; a most creditable musical on Wednesday morning ; a " High-Five " card party on Thursday ; while all of Friday was taken up in delightful sight-seeing, trolley rides, sandwiched with card parties and socials. Among the ladies who were active in all this entertaining, were Mesdames J. C. Wirthman, D. V. Whitney, F. C. Vincent, J. P. Reymonds, J. B. Woods, F. R. Berry, Ferd. Crampton, August T. Fleischmann, W. M. Federman, C. H. Loomis, H. L. Roy, G. W. Rockwell, G. Q. Lake, C. E. Zinn, F. DeCon, F. D. Mitchell, Geo. Eyssell, Wm. Eyssell, Geo. Wirthman, T. A. Moseley, G. F. Berry, Aug. Eyssell, John Ruel ; assisted by the Young Ladies Auxiliary, including Misses Gertrude Fleischmann, Maud and Bertha Wirthman, M. Eyssell, M. Miller, Gertrude Woods, C. De-Honey, Lilly Barthell.

Kansas City, itself, offered much of interest and entertainment to the visitors. The remarkable bluffs and consequent grades and cuts ; the great expanse of river-streaked valley, in full view ; the imposing buildings and great business activity were all engaging, but the most attractive part of the city is the residential section, where so much space is given up to the many pretty houses. The large, well-kept lawns were park-like and offer a most graceful setting to the many miles of magnificent boulevards, all of which was duly enjoyed during the tally-ho and carriage ride on Thurs-

day, when was also seen the beautiful "Cliffe View" and "Cliffe Drive," the "Concorse" and classic "Paseo." This drive ended at the Elm Ridge Club House, where a sumptuous banquet was served to, at least, three hundred guests, who enlivened the occasion with jolly songs and many jests. A dance followed, and the party was taken back to the city in trolley cars.

The Coates House was well adapted to the entertainment of such large parties as assembled to take part in the functions offered there. The reception and dance Monday night was a beautiful affair, and refreshments were bountifully served. Dancing continued until a late hour. The euchre party was well attended, and passed off smoothly and to the entire satisfaction of the prize winners and to the enjoyment of all the other participants.

The entertainment that was most generally enjoyed, and which was decidedly unique, was the trip to Ft. Leavenworth in cars well supplied with refreshments, where was enjoyed a thorough inspection of the Government's largest military post, all its appointments, and the witnessing of manœuvres and drills of all the troops stationed there, including commands of infantry, artillery, mountain artillery and cavalry. The precise drilling and well-ordered movements of the large body of troops was inspiring, and made an impression, as did the courtesies of the commanding officers, that will long and pleasantly linger in the memory of all who were fortunate enough to be present. Much praise is due Messrs. Wirthman, Whitney, Vincent, Federmann, Fleischman, Lake, Rankin and their associates of the Committee of Arrangements for the excellent provision made for everybody's comfort and pleasure.

REPORT

ON THE

PROGRESS OF PHARMACY.

From July 1, 1903, to June 30, 1904.

BY C. LEWIS DIEHL.

INTRODUCTORY.

In harmony with the phenomenally rapid development of industrial and scientific methods of recent years, and the consequent success attending the researches in the entire field of applied medicine, and particularly the production and introduction of the products of synthetic chemistry, of antitoxins, and of useful medicaments derived from plants and from various organs of the animal economy, the annual progress made in the domain of pharmacy increasingly taxes, from year to year, the vigilance of the reporter, so that he shall omit from his report no important facts that may have been announced since the date of previous reports. But the field to be encompassed is so large, that even with the exercise of satisfactory vigilance, the determination of what constitutes an important fact must be "eclectic" rather than "absolute," and hence largely dependent on the individual judgment of the reporter. As has been the aim in previous reports, therefore, the reporter has given preference in his selection to subjects of direct and permanent value to the practical pharmacist; and, without having lost sight of the purely scientific subjects of interest, it is confidently believed that the present report will fairly represent, within the limitations mentioned, the progress in pharmacy made during the past year. To illustrate the rapidity of progress in pharmaceutical and chemical matters, and consequent changes in therapeutic views and methods, some of the difficulties encountered in the forthcoming

Revision of the Pharmacopœia of the United States, 1900, may here be broadly outlined. When the Convention was held in 1900, at Washington, it deliberated upon and formulated a series of "General Principles

to be followed in Revising the Pharmacopœia," these being based upon recommendations submitted by the Committee of Revision of the Pharmacopœia of 1890, which, in turn, were the outcome of the experimentation and deliberation of that committee covering a period of more than six years, and then believed to bring the work fully up to date. Some of the instructions conveyed in these "General Principles" were mandatory, and these were of necessity implicitly adhered to in the revision, while others were simply advisory, and therefore subject to such changes as the necessity of the case might demand. This proved fortunate, for within a comparatively brief period it became evident that the rejection of certain remedial agents, the introduction of which had been considered inexpedient in 1900, would in the light of therapeutic experience since then, be considered a serious blunder in 1904. So, also, in the definition of chemicals, in the construction of formulas and of processes of assay or of identification, the advance made during the past four years has necessitated in some cases a complete revision of the text originally proposed. To this may be attributed, in part at least, the delay in the issue of this important work, which, most likely, will not make its appearance before this report will reach the members of this Association, notwithstanding that Professor Remington, Chairman of the Committee on Revision, had, in June of that year (*Amer. Journ. Pharm.*, 1904, 253-258) expressed the hope that the work would be completed in October. Quoting briefly from this communication, which was made in response to numerous inquiries concerning the

Changes in the Forthcoming Pharmacopœia, it is stated that for the first time in the history of pharmacopœial revision in the United States the work is being revised under the control of a chartered organization, the main objects of obtaining a charter being the separation of the financial and commercial duties from the scientific and expert work of revising and preparing the manuscript, and to give to the whole work of revision a legal and official status, which experience in previous revisions had demonstrated to be a fundamental necessity. Coming then to the work of revision, one of the serious criticisms of the Pharmacopœia of 1880 and 1890 was that in many cases the requirements, notably in the chemical products, were entirely too stringent. In order to remedy this, the convention of 1900 instructed the committee to revise as carefully as possible the limits of purity and strength of the pharmacopœial chemicals and preparations, for which limiting tests can be given—making no concessions towards a diminution of medicinal value, but making allowance for unavoidable, innocuous impurities or variations due to the particular source or mode of preparation, or to the keeping qualities of the several articles. In compliance with this instruction, the Committee of Revision has adopted what has come to be known as the "Purity Rubric," which will be one of the new features of the book. Placed under the official title and English name of the article, it will declare the percentage of the pure substance and the limit of innocuous im-

purity permitted, but will not prevent the sale of the absolutely pure article, or that of a higher grade article, if so elected. It is anticipated that this "Purity Rubric" will, in some degree, also obviate false interpretation in cases coming before the courts in consequence of the Food and Drug Laws of the various states, and this danger of misinterpretation will doubtless be further ameliorated or nullified by the following declaration which will be inserted in the forthcoming Pharmacopœia: "The standards of purity and strength prescribed for any article in the text of this Pharmacopœia are intended to apply to such articles only when used for medicinal purposes, and when professedly bought, sold, or dispensed as such."

That there has been no retrogression, however, in the formulation and demand for standards of purity and quality in essentials is emphasized by the fact that the number of assay processes for drugs, the quality of which can be controlled in this way, has been largely increased. Another new feature will be the introduction of doses. There has been a considerable difference of opinion on this subject, and also some absolute opposition, chiefly on the ground of possible limitations of the allowable doses to be prescribed. This has been adjusted, however, by avoiding the definition of "maximum" or "minimum" doses, and simply inserting the "average" dose, coupled with the declaration, in some part of the Pharmacopœia, that the stated doses are not to be regarded as obligatory on the physician, or as forbidding him to exceed them whenever in his judgment this seems desirable, this declaration being in accord with the explicit instruction by the convention to the committee. Finally, the question of nomenclature has been carefully considered, but changes have only been made when strong reasons were advanced for such. The use of synonyms has, however, been discouraged, and this is in accord with the general principle of placing in the Pharmacopœia preparations which can be controlled by standards or an official description, and leave no room for evasion. The elimination of synonyms as far as possible and practicable, moreover, will necessitate more care on the part of physicians in writing their prescriptions.

From what has thus been quoted—without, however, adhering strictly to Prof. Remington's text—the forthcoming Pharmacopœia will be found to contain a number of innovations, but these have not been inserted without weighty reasons or for the purpose of representing a spirit of progress, for a judicious spirit of conservatism has doubtless also exerted its beneficent influence upon the work accomplished. This much is evident, however, that the innovations made are largely due to the

Change in the Relation of Chemistry to Pharmacy, a topic which is admirably treated in a recent paper communicated by Professor Partheil through the "Apotheker Zeitung." He says that the relation in which chemistry stands to pharmacy is quite different now from what it was at the beginning of the last century. At that time it was customary to ap-

prentice a young man to a good pharmacist in order that he might learn chemistry, but now that chemistry has gained an independent position and possesses better buildings and greater educational facilities than exist in the pharmacist's laboratory, and now that the pharmacist has ceased to make his own preparations, the pharmacy laboratory has ceased to be the nursery of the young chemist. The fact that the production of pharmaceutical chemicals has passed from the hands of the pharmacist to large establishments from which the pharmacist purchases his supplies, renders it more necessary than ever that he should be in a position to test these and determine their value as medicines. Similarly, he also requires a much more profound knowledge of botany and pharmacognosy than heretofore, as he now no longer collects, dries and powders his own drugs; he must therefore be able to identify purchased drugs both entire and powdered, to determine their purity, and to ascertain the proportion of active constituent that they contain. In order to understand and to be able to carry out the numerous tests necessary for these purposes, the pharmacist must have a sufficient grounding in pure chemistry and also a thorough grounding, both theoretical and practical, in pharmaceutical chemistry.

Pure chemistry and pharmaceutical chemistry deal with the same substances and employ the same methods; the difference between them is a difference in problems and in aims. Pure chemistry inquires into the properties of the substances with which it deals, their reactions with one another, and deductions that can be drawn from these; its task is the search for truth; its aim, knowledge. Pharmaceutical chemistry inquires what properties a substance must possess to be suitable for use as a medicine, what impurities are likely to be present, how they may be detected and removed. The task of pharmaceutical chemistry is the inquiry into the suitability of a substance for medicinal use; its aim, the application of this knowledge in practical pharmacy. The Pharmacopœia makes use of several purely physical means of testing drugs, viz., the specific gravity, the melting-point, boiling-point, and solubility. The chemical methods are partly qualitative, partly quantitative, the latter being either gravimetric or volumetric. For the volumetric determinations centinormal solutions are frequently employed, and it is scarcely necessary to say that the skill requisite for the proper performance of these numerous and often delicate operations cannot be learnt in the lecture theatre or in the chemical laboratory during the ordinary course of practical chemistry. For this purpose a course of practical instruction in a pharmacy laboratory is a necessity. In such a laboratory these methods are to be practiced, and thereby the senses made more acute in this particular direction. Under the present conditions the pharmacist requires a more thorough grounding in chemistry and physics than formerly, but the knowledge of chemistry required is that applied to pharmacy, and this can only be taught him by one who has learnt it by observation and practical experience.

It would be a comfort if we could look forward with as much complacency as does Professor Partheil toward

The Future of Pharmacy. for this is a problem which has in recent years been the subject of wide discussion and serious concern, not alone of American pharmacy, but of pharmacy throughout the world. What this means to our British confreres is well evinced in a paper read before the British Pharmaceutical Conference at the meeting in Bristol (1903), in which Mr. Leo Atkinson observes that the future of pharmacy must inevitably force itself on the consideration of the members. He says: "It is abundantly evident that no contemplated legislation will afford even the semblance of protection for the professional side of our business; whether the proprietors of a business be qualified or unqualified is immaterial to the government and the public, so long as the actual work of dispensing and handling scheduled poisons is confined to qualified subordinates." It seems impossible to make either the legislator or the "man in the street" understand that "pharmacy, in the nature of things, is *sui generis*, and cannot be conducted on competition company lines without serious risk to the public, and the certainty that they cannot be supplied with trustworthy drugs. The difference between the best drugs and poor drugs in many instances involves the difference between life and death." "The wide latitude in gradations in quantity and value of drugs (which the purchaser cannot judge) is the opportunity for the sharp, unscrupulous trader, and for this reason pharmacy has suffered more than any vocation from the encroachment of joint stock trading." "Paradoxical as it may appear, year by year, in ordinary retail stores, there is less actual need for any great amount of pharmaceutical skill. The art of prescribing, for reasons too numerous to epitomize, is neglected by modern physicians, prescriptions are fewer, and the bulk of these consist mainly in repacking the various nostrums of advertising manufacturers—none too modest in literary mendacity." "The elements of change may be noted in every direction; historic houses are departing from their traditions to meet a new order of circumstances. Revolutionary change in medical practice and medicaments determines a corresponding change in the products of pharmaceutical manufacturers, seldom to the advantage, or requiring the intermediary skill of the competent pharmacist." The question then arises, "Is retail pharmacy as a distinct avocation any longer a necessary, desirable, or possible factor in the body politic? Is the pharmacist as a specialist to become extinct? The legislatures imply that the disappearance of the pharmacist does not call for parliamentary interference; hence, we must work out our own salvation or be crushed out by circumstances we can neither govern nor control." How to accomplish this salvation is the problem called up by the author's admirable paper, which is here quoted only fragmentarily and in essentials.

Among the many papers that have been abstracted for the present re-

port there are a few that are more conveniently considered here than in the classified text. Professor Albert Schneider (Amer. Journ. Pharm., Jan., 1904, 1-30) has written an interesting review of the world's botanic gardens, with the main object to give some suggestions as to the significance and value of such gardens to the progress of pharmacy and medicine, as

Gardens of Medicinal Plants, and how such gardens may be established in the United States. Briefly alluding to the mythical gardens of antiquity—the Jewish “Gan-edén” or Paradise, the garden of Hesperides, the promised gardens of Mohammed, the gardens of Laertes and of Alcinoüs—he rapidly sketches the gardens of tradition, which perhaps had some foundation in fact—the royal gardens of the ancient Egyptians, the Babylonian or Assyrian gardens, the gardens of King Solomon, and the earlier Persian and Grecian gardens. But the earliest authentic records of botanic gardens are those of the Romans—that of Tarquinius Superbus (534 B. C.), the villas of Cicero at Aspinum, of Sallust on the Quirinal hill, and those of Nero, which were supplemented by the numerous gardens about temples, places of worship, and burial places, comparable to the public parks and cemeteries of to-day. Through Roman influence gardens were gradually established throughout Italy, centuries after the fall of Rome, and from Italy the establishment of gardens spread northward and westward.

Extensive public gardens, established on a scientific and far-reaching economic basis, are of comparatively recent origin, the first one worthy of note being that established in Padua about 1533 (or 1545), in which considerable attention was given to the cultivation of “simples” (medicinal herbs). The first extensive scientific and economic garden, however, was the “Jardin des Plantes” of Paris, founded by Louis XIII. in 1610 and put into active operation in 1634. The influence of this garden, after passing through many vicissitudes in the course of its development, has been far-reaching. All other extensive botanical gardens of the world are copied after this one. The garden is the means of each year adding millions of dollars to the resources and wealth of the French nation, and, in addition, it is a powerful factor in public instruction, and has been the means of developing scientific research which has directly or indirectly added greatly to the health, happiness and comfort of the masses, besides giving French investigators in botany first rank.

The example set by the Jardin des Plantes has been adopted by other countries, extensive gardens, similar in scope to the Paris gardens, being at the present time located in France, England, Germany, Austria, United States, Italy, Holland and Russia. The largest single botanic garden (1,400 acres) in the world is the Buitenzorg garden of Java, founded by the Dutch Government in 1817; the next largest garden (260 acres) being the Royal Botanic Garden at Kew, near London, founded by Lord

Capel in 1759, and the third largest is in our own country—the New York Botanic Garden, in Bronx Park, established in 1891. Notwithstanding the greater area of these gardens, however, the “Jardin Botanique de la Faculté de Médecine,” which is part of the Jardin des Plantes, and was established in 1869, is perhaps the largest and most complete garden of medicinal plants in the world, and it is with the hope of awaking and fostering an interest in the establishment of gardens devoted exclusively to the cultivation and study of medicinal plants that the paper here quoted has been written by its author, and to mention that he outlines a plan for the establishment of such gardens in the United States. But in order that a maximum of good or desirable results may be obtained there should be an agreement by the authorities of the different botanic gardens as to the scope of the work, so that there may be little if any duplication, and the work of the one may supplement the work of the other in developing the resources of our own country with regard to medicinal plants. Thus, to illustrate, the following gardens are already launched or being planned: New York botanic gardens (ready for active work), Shaw botanic gardens, St. Louis (in operation); Philadelphia (contemplated); Ann Arbor (in operation); Indiana State University (contemplated); and San Francisco (active work begun). Prof. Schneider suggests that the New York garden investigate and develop the resources of the southeastern United States, West Indies, and parts of South America; the St. Louis gardens, the central and southern United States, Mexico and South America; Philadelphia, the northeastern United States, southern Europe, India and Asia; Ann Arbor, the northern United States, Canada and northern Europe; the Indiana gardens, the central States and the Northwest, including Alaska; the San Francisco gardens, the Pacific States and the Orient, including the Philippine Islands. These are mere suggestions based upon a co-operative idea. The Department of Agriculture being already engaged in a similar direction, would no doubt be willing to co-operate in maturing plans.

The Conservation and Cultivation of Medicinal Plants is the subject of a comprehensive paper by Professor Henry Kraemer (Amer. Journ. Pharm., Dec., 1903, 553–569) in which he calls attention to wholesale destruction, not alone of forests, by cutting and fires, but also the probability of the extermination in the near future of many native herbs and drugs if the gathering of them continues unchecked, as in the Blue Ridge Districts of North and South Carolina and Tennessee. Indeed, some plants, such as spigelia, serpentaria, senega, cypripedium, etc., are growing so scarce as to be obtainable with great difficulty now. One locality after another is exhausted, and if it were not for the fortunate discovery of new fields in some instances, certain drugs would not be obtainable at all. The conservation of useful plants is therefore imperative, and when we see, as in the case of coca and cinchona, that man by selection and

cultivation has not only conservedly improved certain plants, it is important that we study our medicinal plants in their natural surroundings until we have gained such a knowledge of the peculiar requirements of each that they may be cultivated successfully and thus conserved before they are exterminated. The author mentions under different captions some five hundred different medicinal plants, both by their common English names and their botanical titles, and makes in numerous instances specific remarks concerning them. Of this number, 190 are known to be cultivated in the U. S.; 178 are wild, indigenous or naturalized medicinal plants; 56 foreign medicinal plants might be cultivated; while only 75 foreign plants are in his opinion uncertain of cultivation. It is true that these figures are more or less approximate; but they show that about three-fourths of all medicinal plants are growing either wild or in cultivation in this country, and that of the remaining one-fourth probably one-half could be also grown under cultivation. The author also briefly discusses the conditions for cultivating medicinal plants, experience in seed germination, the collection, the curing and the yield of drugs. In his concluding remarks he says: "The American people are awakening to the necessity of the preservation of our native forests and of our wild flowers. We are beginning to realize that the care of our native plants is a trust, and are becoming aware that even our own safety and sustenance is dependent upon the intelligence which we exercise in the care of them." "There are some who are impatient with the spirit of wastefulness and destructiveness of the American people. But it is important to remember that it has been natural for Americans to secure the largest prizes of our resources first." "As one region is exhausted new localities are discovered, and we have been inclined to believe with the great Huxley, that man's efforts of replacement are futile compared to nature's own resources." But we are confronted with a fact, not a theory, and we believe that Americans will be as successful in the conservation of their forests and wild plants and animals as they have been original, fearless and fortunate in the discovery of her treasures and the development of her resources.

Professor Edward Kremers publishes in the "Pharm. Review" (May, 1904, 183-194) a very comprehensive list of the titles of notes and papers concerned with the

Application of Chemistry to the Study of Plant-Life—studies which have, from his initiation into the realms of chemical research, had a charm for him, which has never deserted him altogether, although compelled by other investigations and manifold duties to abandon phytochemical problems for greater or less periods. The object of this compilation of titles is not so much to effect an inventory as it is to place in the hands of the student investigators of his laboratory a convenient bibliography of work done, and to point out to them the connecting thought that makes many of these notes the result of a deliberate plan rather than of a haphazard

seeking for new isolated facts. The list, however, does not include the titles of purely chemical investigations of plant products, such as menthol and its derivatives, citronellol and its derivatives, abietic acid, etc., some of which have grown out of phytochemical investigation. Neither are the earlier investigations of Professor F. B. Power, nor more recent investigations of Professor R. Fischer (on alkaloids) included. The catalogue consists simply of the fragmentary notes published by the author or by students working under his direction, and as such will doubtless prove useful to experimenters on phytochemical subjects in general.

Balearic Botany, 1903, is the title of a very interesting account of a visit by Mr. J. W. White to the Balearic Islands made in company with a friend during a brief Easter vacation of eighteen days, for the purpose of studying the flora of this remarkable group of Mediterranean Islands. Mr. White mentions and describes a large number of plants found on Minorca and Majorca, to which two islands his visit seems to have been confined. Incidentally, also, he speaks entertainingly of the inhabitants, their simple customs, the kindness of their disposition, and the apparent absence of poverty and vice. The paper will doubtless prove an important contribution to our knowledge of the botany of a little-visited region, and may be consulted in the Yearbook of Pharmacy recording the Transactions of the British Pharmaceutical Conference held at Bristol in 1903.

The proposed visit of the members of the conference in attendance at the Bristol meeting (1903) to

The Ancient Thermal Springs at Bath gave the incentive to a paper by Mr. W. J. Hallet, in which he speaks interestingly of the theory of production, physical characters, origin of the constituents, temperature, gases, medicinal efficacy and historical facts concerning these waters. Aside from the direct interest to the members of the Conference, in view of their anticipated visit (since consummated) to the delightfully-situated city in the valley of the Avon, this paper serves the excellent purpose of a reminder, in the light of the ever-increasing popularity of mineral-water-therapy of modern times, that "there is nothing new under the sun," and that the remedial value of thermal and other mineral waters was well recognized at and before the period of the Roman conquest of Britain. Is it not a strange coincidence, Mr. Hallet observes, that nearly 2000 years ago the Romans should have named the springs "Aquae Solis"—waters of the sun—and to-day one of our greatest chemists pronounced them to be almost the only terrestrial source of "helium," that element existing chiefly in the sun. Prof. Dewar has laid down a plant at Bath for collecting the gas from the springs to furnish the Royal Institution with a plentiful supply of nitrogen and helium. Physically, the water as drawn from the springs is clear and sparkling; in small quantities colorless, but in large volumes it assumes a pale sea-green tint. It is odorless, and to the taste slightly saline, pungent and chalybeate. Standing exposed to the air it

deposits the iron held in solution by the carbonic acid gas. Its specific gravity is 1.002, and temperature is constant at 120° F., this exceptionally high temperature having been ascribed to the progressive chemical changes that must be continually going on in the structure of the earth. In regard to the origin of the mineral and gaseous constituents of the water, it is the assumption of Sir Charles Lyell that the water itself is supplied from some mountainous district, possibly a great way off, and it may be inferred that the rain water permeating the earth would carry down the various salts from gypseous, calcareous and decomposing saline rock. The quality and quantity of the water never varies, and the three springs daily yield 507,000 gallons, while the volume of gas evolved from these waters is also remarkable, no less than 250 cubic feet being given off daily, over 96 per cent. of this being nitrogen, which Lyell considers is wholly derived from atmospheric air carried down by the rain water. According to an elaborate examination made by Prof. Williamson, in 1865, the volume composition of this mixture of gases was the following: Carbonic acid, 3.056; oxygen, 0.617; marsh gas, 0.216 and nitrogen, 96.11 per cent. To this must be added the more recent discovery of Lord Rayleigh that the gaseous mixture also contains argon and helium, the latter amounting to 0.12 per cent. by volume. The solid constituents of the water, according to Dr. Attfield, amounting to a little over 168 grains in the (Imp.) gallon, are preponderatingly calcium sulphate, magnesium chloride, sodium chloride and sulphate, with smaller quantities of calcium carbonate and nitrate, potassium sulphate and nitrate, magnesium carbonate, iron carbonate and silica, and to them must be added strontium, which Prof. Roscoe determined in the spectrum produced with the residue of evaporation, as well as by direct chemical analysis. Concerning the medicinal efficacy of these waters, Mr. Hallet observes that the mineral and gaseous constituents of the Bath springs offer no explanation of their known usefulness in rheumatism and skin complaints, as well as of their reputed value in the treatment of disease as testified by the number of bathers who go under the treatment. Formed in nature's own laboratory, deep down in the bowels of the earth, with a cunning and skill that no artificial mixture is able to rival, it commands the respect and attention of all.—Trans. Brit. Pharm. Conf., 1903, 481-486.

Another communication, which should not be underestimated, is the following:

List of Historical Reference Works Pertaining to *Materia Medica, Medicine and Chemistry*, communicated to the Amer. Journ. Pharm. (Feb. 1904, 81-84) by Dr. Frederick Hoffmann, "in consequence of occasional inquiries and with the object of saving others the perplexities often experienced of finding in the mass of ancient, medieval and more recent literature, the most useful books for historical studies in the domains of medicine, pharm-

acy, materia medica and chemistry." Dr. Hoffmann has generously prepared two lists of select works for reliable references and for study, which are here reproduced, so that they may be preserved for permanent accessibility. List I. comprises a selection of works replete with bibliographic references and comments, as also with bibliographic information and notes; List II., a number of miscellaneous works relating to the subject of the respective sciences in general, and to the history of organic materia medica, medicine, pharmacy and chemistry in particular. These works afford a comprehensive survey of the pertaining literature from antiquity to modern times and offer valuable information conducive to the ready and proper choice of the literary resources best suited for historical research and study in the respective domains of knowledge.

LIST I.

In Chronologic Order.

Kurt Sprengel, "Versuch einer pragmatischen Geschichte der Arzneikunst." 4 vols. Halle, 1792-1799. 4th edition. Leipzig, 1846.

T. F. Gmelin, "Geschichte der Chemie bis ans Ende des 18. Jahrhunderts." 3 vols. Göttingen, 1797-1799.

L. Choulant, "Handbuch der Bücherkunde für die ältere Medicin," zur Kenntniss der griechischen, lateinischen und arabischen Schriftsteller im aertztlichen Fache und zur bibliographischen Unterscheidung ihrer verschiedenen Ausgaben, Uebersetzungen und Erläuterungen. Leipzig, 1828. 2d edition under the title: "Geschichte der Literatur der älteren Medicin." Leipzig, 1841.

A. C. P. Callisen, "Medicinisches Schriftsteller Lexicon der jetzt lebenden Aerzte, Naturforscher, Apotheker, etc., aller gebildeten Völker." 33 vols. Kopenhagen and Altona, 1830-1845. (Replete with details concerning the literature of medicine, materia medica and natural sciences).

J. C. Poggendorff, "Bibliographisch-literarisches Handwörterbuch" zur Geschichte der exacten Wissenschaften, enthaltend Nachweisungen über die Lebensverhältnisse und Leistungen der Naturforscher.

H. C. Bolton, "A Select Bibliography of Chemistry," from the year 1492 to 1892. Washington, D. C., 1893. Supplement, 1899.

LIST II.

Lassen, "Indische Alterthumskunde." 5 vols. Bonn, 1847. 2d edition. Leipzig, 1858-1862.

E. F. R. Rosenmüller, "Handbuch der biblischen Alterthumskunde." 4 vols. Leipzig, 1830-1831. (Vol. I, pp. 1-347, describes the minerals and plants of the Bible).

Möhsen, "Geschichte der Wissenschaften." 4 vols. 1810.

Whewell, "History of the Inductive Sciences" from the earliest to the present time. 3d edition. 3 vols. London, 1857.

A. H. L. Heeren, "Ideen über die Politik, den Verkehr und den Handel der vornehmsten Völker der alten Welt." 2 vols. Göttingen, 1793-1796.

W. Heyd, "Geschichte des Levante Handels in Mittelalter." 2 vols. Stuttgart, 1879.

I. C. Wiegand, "Geschichte des Wachstums und der Erfindungen in der Chemie" in der ältesten und mittleren Zeit. 2 vols. Berlin, 1790-1791.

I. C. Wiegand, "Geschichte des Wachstums und der Erfindungen in der Chemie" in der neueren Zeit. Berlin, 1790-1791.

J. Beckmann, "Beiträge zur Geschichte der Erfindungen." 4 vols. Leipzig, 1780-1803.

J. Beckmann, "A History of Inventions, Discoveries and Origins," translated from the German by Wm. Johnston. 2 vols. London.

H. Haeser, "Lehrbuch der Geschichte der Medicin." 3 vols. Jena, 1852. 3d edition. 1875-1882. (Replete with historical and bibliographic notes.)

J. F. Royle, "Essay on the Antiquity of Hindoo Medicine." London, 1837.

J. F. Royle, "Das Alterthum der Indischen Medicin." Uebersetzt von Wallach und Hensinger. Cassel, 1839.

Wüstenfeld, "Geschichte der arabischen Aerzte und Naturforscher." Göttingen, 1840.

A. Philippe und Ludwig, "Geschichte der Apotheker" bei den wichtigsten Völkern der Erde. 2d edition. Jena, 1858. (Replete with information on the history of pharmacy, pharmaceutical education and bibliography.)

J. Berendes, "Die Pharmacie bei den alten Kulturvölkern." 2 vols. Halle, 1891.

Dioscorides, "De materia medica libri quinque." Kühn's Collectio. Vol. 25. Edited by Curtius Sprengel. Leipzig, 1829.

C. H. Pfaff, "System der Materia Medica." 7 vols. Leipzig, 1818-1824. (Replete with references to earlier writings. Vol. 1, pp. 28-41, contains a list of the pertinent literature of the eighteenth century.)

F. A. Flückiger and Dan. Hanbury, "Pharmacographia." London, 1879.

F. A. Flückiger, "Pharmakognosie des Pflanzenreiches." 3d edition. Berlin, 1891. (Both these works contain in an appendix a list of earlier works and bibliographical references.)

E. Gildemeister and Fr. Hoffmann, "Die Aetherischen Oele." Berlin, 1899. (Replete with historical and bibliographic notes and references.)

Ferd. Höfer, "Histoire de la Chimie," depuis les temps les plus reculés jusqu'à notre époque. 2 vols. Paris, 1859.

Hermann Kopp, "Geschichte der Chemie." 4 vols. Braunschweig, 1843-1847.

E. von Meyer, "Geschichte der Chemie." 2d edition. Leipzig, 1895.

Chr. G. Schmieder, "Geschichte der Alchemie." Halle, 1832.

Theophrastus, Eresius, "De Historia plantarum libri decem." Editio Wimmer. Lipsiae, 1854.

Balfour, "The Plants of the Bible." London, 1885.

Woenig, "Die Pflanzen des alten Aegyptens." Leipzig, 1886.

Bretschneider, "On the Study and Value of Chinese Botanical Works." Foochow, 1870.

Hehn, "Kulturpflanzen und Hausthiere in ihrem Uebergange aus Asien nach Griechenland und Italien." 3d edition. Berlin, 1877.

Pritzel, "Thesaurus literaturæ botanicæ omnium gentium." Leipzig, 1872. (Contains on pp. 378-406 and p. 416 a list of the earlier American botanical literature.)

Kurt Sprengel, "Geschichte der Botanik." 2 vols. Leipzig, 1817.

Meyer, "Geschichte der Botanik." 4 vols. Königsberg, 1854-1857.

—Amer. Journ. Pharm., 76, No. 2 (Feb., 1904), 81-84.

PROCEEDINGS OF THE STATE PHARMACEUTICAL ASSOCIATIONS.

Following is the usual information concerning the annual meetings of the State Pharmaceutical Associations during the year 1903. As in the experience of past years, also, the "Proceedings" of less than one-half of these Associations have reached the reporter—these being indicated by

the words "from Proceedings," following the abstracts made from them, while, similarly, the words "from Journals" denote the source of the other abstracts :

Alabama.—The Twenty-second Annual Meeting of the Alabama Pharmaceutical Association was held at Montgomery, May 20–21, 1903, in three sessions. J. L. Parker, of Birmingham, was elected President ; W. E. Bingham, of Tuscaloosa, Secretary. The following papers were read :

"How the Association May be Made of Great Benefit to its Members," by J. A. Harris.

"The Ethics of Pharmacy," by C. T. Rupp.

"Better Prices for Drugs," by G. B. McVay.

"A Few Points upon Laws Regulating the Practice of Pharmacy in the State of Alabama," by A. K. Rennic. (*From Proceedings.*)

Arkansas.—The Twenty-first Annual Meeting of the Arkansas Association of Pharmacists was held at Little Rock, May 12 to 14, 1903, in four sessions. R. B. King, of Helena, was elected President ; Will C. Bond, of Little Rock, Secretary. The following papers were read :

"Occidental Odds and Ends," by W. W. Kerr.

"On Cotton-seed Oil," by R. B. King.

A feature at this meeting was the opening of "A Question Box," which consisted in presenting a number of practical questions on pharmaceutical topics for discussion, such as prescription difficulties, incompatibilities, emergency cases, etc. (*From Proceedings.*)

Colorado.—The Fourteenth Annual Meeting of the Colorado Pharmaceutical Association was held at the Hotel Ramona, Cascade, June 23–26, 1903. Charles J. Clayton, of Denver, was elected President ; Charles E. Ward, of Denver, Secretary. (*From Journals.*)

Connecticut.—The Twenty-seventh Annual Meeting of the Connecticut Pharmaceutical Association was held at Green's Farms, on June 17, 1903. John A. Levery, of Bridgeport, was elected President ; Charles A. Rapelye, of Hartford, Secretary. (*From Journal.*)

Delaware.—The Seventeenth Annual Meeting of the Delaware Pharmaceutical Society was held at Brandywine Springs, on June 11, 1903. Francis E. Gallagher, of Wilmington, was elected President ; Frederick W. Fenn, of Wilmington, Secretary. Interesting lectures were delivered :

"On Water Filtration," by Professor Robin, Bacteriologist of Water Department ; and,

"On College Work," by Professor F. X. Moerk, of the Philadelphia College of Pharmacy. A paper

"On the New Quinine Compounds," was read by Herbert J. Watson. (*From Journals.*)

Georgia.—The Twenty-eighth Annual Meeting of the Georgia Pharmaceutical Association was held at Macon, May 19–20, 1903, in three ses-

sions. Charles D. Jordan, of Monticello, was elected President ; J. B. Riley, of Macon, Secretary. The following papers were read :

"Some Matters Worthy of Attention," by Geo. F. Payne.

"On Legislation," by James L. Henry. (*From Proceedings.*)

Illinois.—The Twenty-Fourth Annual Meeting of the Illinois Pharmaceutical Association was held at Bloomington, June 9–10, 1903. Thos. Knoebel, of East St. Louis, was elected President ; R. N. Dodds, of Springfield, Secretary. The following papers were read :

"Side Lines," two papers, by Charles H. Avery, and by E. E. Haller.

Indiana.—The Twenty-First Annual Meeting of the Indiana Pharmaceutical Association was held at Anderson, June 17–19, 1903, in six sessions. O. C. Bastian, of South Bend, was elected President ; A. Timberlake, of Indianapolis, Secretary. A "Query Box" was opened during several of the sessions, and a number of practical questions presented which were very interestingly discussed by the members generally. The following papers were read :

"The Old and The New," by A. J. Detzer.

"The Drug Business in Small Towns," by George Baas.

"Notes on Advertising," by A. R. Otis.

"Pharmacy of the Future," by J. Newton Roe.

"The Other Fellow's Drug Store," by Victor E. Silverberg.

Interesting lectures were also delivered, illustrated by numerous lantern slides.

"On Some Prescriptions," by Prof. J. W. Sturmer, and

"Concerning the Starches," by John S. Wright.

—(*From Proceedings.*)

Indian Territory.—See "Oklahoma."

Iowa.—The Twenty-fourth Annual Meeting of the Iowa Pharmaceutical Association was held at Council Bluffs, July 14–16, 1903. Dell G. Morgan, of Council Bluffs, was elected President ; Fletcher Howard, of Des Moines, Secretary. (*From Journals.*)

Kansas.—The Twenty-fourth Annual Meeting of the Kansas Pharmaceutical Association was held at Chanute, May 26–28, 1903. T. G. Gehring, of Wichita, was elected President ; E. E. Lair, of Topeka, Secretary. An interesting feature of the meeting was the discussion of twenty-one questions of practical importance by the members in attendance. (*From Journals.*)

Kentucky.—The Twenty-sixth Annual Meeting of the Kentucky Pharmaceutical Association was held at Estill Springs, June 16–19, 1903, in four sessions. C. W. Peters, of Sharpsburg, was elected President ; J. W. Gayle, of Frankfort, Secretary. The following papers were read :

"How Shall the Buyer Meet the Salesman?" 3 papers : by Vernon Driskell, J. W. Gayle, and T. B. Wood.

"How Shall the Drummer Approach the Buyer?" 2 papers: by E. H. DeMoss and G. S. Hazard.

"The Old Time Pharmacy," by T. B. Wood.

"The Best Methods of Increasing the Retail Business," 3 papers: by D. C. McDowell, W. H. Tibbals and Addison Dimmitt.

"The Little Green Stamp Over the Cork of Bottled Whiskey," 2 papers: by Burr M. Overton and J. W. Gayle.

"How Can a Druggist's Wife Best Promote her Husband's Interest?" 2 papers: by Mrs. Burr M. Overton and Miss Eleanor Diehl. (*From Proceedings.*)

Louisiana.—The Twenty-first Annual Meeting of the Louisiana State Pharmaceutical Association was held at New Orleans, May 12-14, 1903, in four sessions. W. P. Duplantis, of New Orleans, was elected President; Geo. W. McDuff, of New Orleans, Secretary. An interesting report was made by the Committee on Adulteration. The following papers were read:

"Tincture of Iodine—Its Decompositions and Their Determination," by Philip Asher.

"The Use of Purified Kaolin as an Absorbent and an Aid in Filtration," by Walter T. Taylor. (*From Proceedings.*)

Maine.—The Twenty-sixth Annual Meeting of the Maine Pharmaceutical Association was held at Rockland, June 29-30, 1903. Frank T. Crane, of Machias, was elected President; M. L. Porter, of Danforth, Secretary. (*From Journals.*)

Maryland.—The Twenty-first Annual Meeting of the Maryland Pharmaceutical Association was held at Ocean City, July 21-24, 1903, in five sessions. Wm. E. Brown, of Baltimore, was elected President; Louis Schulze, of Baltimore, Secretary. An important and highly interesting report was received from the Committee on Advancement of Pharmacy, and the following papers were read:

"Copper Oleate," by J. J. Barnett.

"Remarks Upon the Compounding of Several Pharmaceutical Preparations," by H. A. H. Dunning.

"Borosalicylic Acid," by H. L. Troxel.

"Will Pharmacy be Taught Exclusively by Correspondence? Is Pharmacy thus Taught of any Practical or Lasting Value? Should the Teaching of Pharmacy by Correspondence be Regulated by Legislation?" by Daniel Base.

"Notes on Syrup of Ferrous Iodide Containing Dextrose and the Action of Dextrose on Iodine," by Daniel Base.

"Borax and Mustard—Are They Pure as Found in Trade?" by A. R. L. Dohme.

"The Pharmacopœia and the Pharmacist," by A. R. L. Dohme.

"Ferrous Carbonate in Pills and Tablets," by Wm. J. Lowry, Jr.

"What are Our Greatest Requirements in Future Pharmaceutical Legislation Before Our Next Legislature?" by D. Millard.

"Methods of Popularizing the National Formulary with the Physician, Especially as Regards Compound Pepsin Powder and Compound Elixir of Buchu," by Louis Schulze.

An interesting talk was also given at one of the sessions by Dr. A. R. L. Dohme, in which he described the conditions of pharmacy as observed by him during a recent journey through a number of foreign countries, particularly those bordering on the Mediterranean. (*From Proceedings*).

Massachusetts.—The Twenty-second Annual Meeting of the Massachusetts State Pharmaceutical Association was held at North Adams, June 9–11, 1903, in four sessions. C. P. Flynn, of Boston, was elected President; James F. Guerin, of Worcester, Permanent Secretary. Interesting reports were made by the Committee on Adulterations and by special committees who visited the Biological Laboratories of Bussey Institute, of H. K. Mulford Co., and of Park, Davis & Co. The following papers were read:

"Tools for Making Money," by Wilbur L. Scoville.

"Legal Names Under a Proposed Massachusetts Law," by Henry D. Smith.

"An Evening Chemistry Lecture," by Herman Heinritz.

An interesting lecture on Biological Products, illustrated by about twenty-five slides, was delivered by W. W. Bartlett, and has been made part of the Proceedings of the Association. (*From Proceedings*.)

Michigan.—The Twenty-first Annual Meeting of the Michigan State Pharmaceutical Association was held at Battle Creek, September 8, 9, 1903, in three sessions. A. L. Walker, of Detroit, was elected President; W. H. Burke, of Detroit, Secretary. An interesting report was received from the Committee on Adulteration, and the following papers were read:

"The Causes and Remedies of the Decline of the Prescription Business," by Wm. C. Kirchgessner.

"A Plea for Practical Work in State Board Examinations," by J. W. T. Knox.

"On the Qualitative Testing for Methyl Alcohol when Mixed with Ethyl Alcohol," by A. B. Prescott.

"The Limitations and Possibilities of the Retail Drug Business," by Martin Dodsworth.

"Elixir of the Glycerophosphates of Lime and Soda," by Wm. C. Kirchgessner.

"Paying for Dead Horses," by J. Major Lemen. (*From Proceedings*.)

Minnesota.—The Nineteenth Annual Meeting of the Minnesota State Pharmaceutical Association was held at New Ulm, June 16–18, 1903, in

four sessions. Joseph W. Lauer, of Winona, was elected President ; Theo. F. Leeb, of Winona, Secretary. Interesting reports were received from the Committees on Adulteration and on the Revision of the U. S. Pharmacopœia, and the following papers were read :

"How to Become a Successful Pharmacist," by Stewart Gamble.

"The Proprietary Preparation," by H. W. Rietzke.

"The College of Pharmacy of the University of Minnesota—Historical" (a continuation of previous papers), by Prof. F. J. Wulling. (*From Proceedings.*)

Missouri.—The "Silver Jubilee" Meeting of the Missouri Pharmaceutical Association was held at Pertle Springs, Warrensburg, June 9-12, 1903, in six sessions. C. L. Wright, of Webb City, was elected President ; Dr. H. M. Whelpley, Permanent Secretary.

The Committee on National Formulary presented an interesting report, and the following papers were read :

"Commercial Pharmacy," by C. L. Wright.

"List of Authors and Classification of Contributions (to the Missouri Pharmaceutical Association) of the Past Twenty-four Years," by Francis Hemm.

"Notes on Methyl Salicylate in Our Pharmacopœia," by Dr. Gustavus Hinrichs.

"Oxychloride of Mercury," by Francis Hemm.

"Philippines—Pharmacal and Medical," by J. F. Llewellyn.

"How Would You Manage a Drug Store," by A. Brandenberger.

"Review of Papers," (contributed by the Mo. Ph. A.) for the Twenty-Four Years," by Francis Hemm.

"Silver Jubilee Retrospect," by Francis Hemm.

"Some New Preparations of the National Formulary, by Francis Hemm.

"Stock Cards," by Wm. Mittelbach.

"The 1900 U. S. Pharmacopœia," by Dr. H. M. Whelpley.

"Why Does Sodium Iodide Produce Heat, and the other Iodides Cold, when Dissolved in Water?" by Wm. Mittelbach.

"Why Some Fail and Others Pass the Board of Pharmacy Examinations," by A. T. Fleischmann. (*From Proceedings.*)

Nebraska.—The Twenty-second Annual Meeting of the Nebraska Pharmaceutical Association was held at Grand Island, June 2-4, 1903. C. E. Hopping, of Beaver City, was elected President ; Oscar Bauman, of Grand Island, Secretary. The following papers were read :

"Should the Ordinary Pharmacist Push his Preparations?" by A. Rabinowitz.

"Galenical Pharmacy," by J. E. Hayes.

"The Loup Valley Druggists' Association," by J. E. Goodrich.

- "The United States Pharmacopœia," by Dr. H. M. Whelpley.
"Pharmacy of the Past and Future," by Karl Thelan.
"The Relation of Druggist to Physician," by Dr. L. I. Bogen.
"Observation a Good Thing," by Sidney Eastman.
"Co-operation in Pharmacy," by H. H. Hartman.
"The American Pharmaceutical Association," by Dr. H. M. Whelpley.
"Toxicology," by C. A. Seiffert.
"A Plea for the Pharmaceutical Side of Pharmacy," by J. L. Kendall.
"Pharmacy of the Future," by Jay G. Roberts.
"Our Association," by P. Strausbaugh.
"Method of Preparing Prescriptions Directed to be Dispensed in Capsules," by J. H. Schmidt.
"The Sacred Red Pipestone Quarries of Minnesota," by Dr. H. M. Whelpley.
"A Talk on Advertising," by C. H. Merriam.
"Practical Advertising Points," by R. D. McFadden.
"The History of Antiseptics," by Miss Pope. (*From Journals.*)

New Hampshire.—The Thirtieth Annual Meeting of the New Hampshire Pharmaceutical Association was held at "The Weirs," Lake Winnepesaukee, June 23–24, 1903, in three sessions. William D. Grace, of Portsmouth, was elected President, John H. Marshall, of Manchester, Secretary. Routine business only appears to have occupied the attention of the association at this meeting. (*From Proceedings.*)

New Jersey.—The Thirty-third Annual Meeting of the New Jersey Pharmaceutical Association was held at Asbury Park, June 10–11, 1903, in two sessions. George S. Campbell, of Millburn, was elected President, Frank C. Stutzler, of Elizabeth, Secretary. The following papers were read :

"Chemical Adulterants and Methods of Detection," by J. C. Arthur St. James.

"Laboratory Notes.—A Discourse Upon the Phenacetin Question," by August Drescher.

"Improvement of Mixture Glycyrrhiza Co. U. S. P.," by Prof. P. E. Hommell.

"Spiritus Ætheris Co." by Prof. P. E. Hommell.

"The Borage Family," by Prof. P. E. Hommell.

"The Contract System," by Chas. H. Landell. (*From Proceedings.*)

New York.—The Silver Jubilee Meeting of the New York State Pharmaceutical Association was held at Utica, June 16–19, 1903, in six sessions. Dr. William C. Anderson, of Brooklyn, was elected President; Edward S. Dawson, of Syracuse, Secretary. Interesting reports were received from the Committee on New Remedies and from the Committee on Adulteration. The following papers were read :

"Pharmacy, Past and Present," by Edward S. Dawson.

"Shop Notes and Dispensing Hints," by W. A. Dawson.

"A Process for Separating Certain Alkaloids on a Small Scale," by Burt E. Nelson.

"A Mechanical Pill Roller for the Prescription Counter," by Burt E. Nelson.

"A Retrospect," by Geo. J. Seabury. (*From Journals.*)

North Carolina.—The Twenty-fourth Annual Meeting of the North Carolina Pharmaceutical Association was held at Morehead City, June 11-12, 1903, in three sessions. W. E. Leslie, of Morgantown, was elected President; T. W. Vaughan, of Durham, Secretary. The following paper was read:

"Oil of Turpentine by the Distillation of Wood," by W. W. Horne. (*From Proceedings.*)

North Dakota.—The Eighteenth Annual Meeting of the North Dakota State Pharmaceutical Association was held at Fargo, August 4-6, 1903, in three sessions. W. P. Porterfield, of Fargo, was elected President; W. S. Parker, of Lisbon, Secretary and Treasurer. The following papers were read:

"Pharmacy," by H. L. Haussamen.

"Legal Notes," by W. S. Parker. (*From Proceedings.*)

Ohio.—The Twenty-fifth Annual Meeting of the Ohio State Pharmaceutical Association was held at Toledo, June 23-25, 1903, in six sessions. Lewis C. Hopp, of Cleveland, was elected President; Theo. D. Wetterstroem, of Cincinnati, Permanent Secretary. The following papers were read:

"Union Examination—A Suggestion Toward a Foundation for a National Pharmacy Examination," by Joseph Feil.

"Is the Sale of Poison on the Increase?" by J. F. Kutchbauch.

"How do Flavoring Extracts as Sold by Grocers Compare with U. S. P. Spirits?" by J. F. Kutchbauch.

"Physiology in Pharmacy," by Geo. H. Matson, Jr.

"Laboratory Methods of Teaching Pharmaceutical Materia Medica," by Dr. R. A. Hatcher.

"Bottling Whiskey in Bond," by J. W. Gayle.

Oklahoma and Indian Territory.—A joint meeting of the Oklahoma and Indian Territory Pharmaceutical Associations was held at Oklahoma City, May 13-15, 1903—this being the 12th Annual Meeting of the Oklahoma and the Eighth Annual Meeting of the Indian Territory Association. In the

Oklahoma Association, J. F. Seyforth, of Oklahoma City, was elected President; F. M. Weaver, of Oklahoma City, Secretary and Treasurer. In the

Indian Territory Association, F. G. Savage, of Hartshorn, was elected President; H. D. Kniseley, of Chicotah, Secretary. The following paper was read at the joint sessions of the two associations:

"What are We Here for and What is to be Gained by our Meeting Here?" by L. Matthews (I. T.).

The joint session was characterized by a lively interest in various topics of a practical character, the discussions on which are reported in the Proceedings. The present volume of Proceedings also includes the Proceedings of the two Associations of the meetings held in 1902, at which the following papers were read:

"Practical vs. Theoretical Pharmacy," by J. F. Seyforth (Okl.).

"Paint as a Side-Line in our Profession," by Marshall Tucker (Okl.).

"Profitable Side-Lines for the Druggist," by C. R. Miller (Okl.).

"Business Requirements of Druggists and the Honor of Acquiring it as a Profession," by Edw. Shanahan (I. T.).

"Manufacturing Pharmaceutical Preparations in a Retail Drug Store," by Moody R. Tidwell (I. T.). (*From Proceedings.*)

Pennsylvania.—The Twenty-sixth Annual Meeting of the Pennsylvania Pharmaceutical Association was held in the Crestmont Inn, Eagles Mere, June 23–25, 1903, in six sessions. William O. Frailey, of Lancaster, was elected President; Jacob A. Miller of Harrisburg, Secretary. The following papers were read:

"Assay of Ferrous Carbonate Preparations," by F. X. Moerk.

"Basham's Mixture," by J. W. England.

"Benefits from Membership in Local Pharmaceutical Associations," by D. J. Reese.

"Boomerang Advertising," by W. O. Frailey.

"Danger of Using Bottles taken from Rooms where there is Contagious Disease," by Theo. Campbell.

"Drug Store Stock—How to be Kept," by D. J. Thomas.

"Efforts to Secure Certificates of Proficiency from the State Board of Pharmacy," etc., by L. Emanuel.

"Ergot—Extract and Fluid Extract," by J. Percy Remington.

"Free Hydrochloric Acid and Lactic Acid in Gastric Juice," by F. E. Niece.

"Granular Effervescent Salts," by E. F. Cook.

"Happy Thought Folded Powder Holder," by I. M. Weills.

"Headache Remedies from Coal-Tar Derivatives," by L. Emanuel and R. V. Mattison.

"Home-Made Conveniences," by W. O. Frailey.

"How Can Pharmacists be Influenced to Join the Pennsylvania Pharmaceutical Association?" by C. A. Weidemann.

"How Can Druggists Become More Public Spirited and Enterprising?" by J. F. Patton.

- "Jottings from a Pharmacist's Note-Book," by C. B. Lowe.
- "Laboratory Notes," by Willard Graham.
- "Method of Preparing Fruit Syrup for Soda Water," by F. E. Niece.
- "Multum in Parvo," by B. E. Pritchard.
- "Pharmacist and His Neighbor," by J. Eppstein.
- "Pharmacy Abroad," by C. N. Boyd.
- "Post-Office Stations in Drug Stores," by O. W. Voterlund.
- "Powder Mixer and Percolator," by H. F. Ruhl.
- "Scraps from a Note-Book," by M. H. Bamford.
- "Standard Sieves," by J. P. Remington.
- "Substitution," by M. F. Wilbert.
- "Syrup of Calcium Lactophosphate," by C. H. La Wall.
- "Syrup of Ferrous Iodide," by W. F. Horn.
- "Tincture of Kino," 2 papers. by Geo. M. Beringer and F. E. Niece.

(*From Proceedings.*)

Rhode Island.—The Thirtieth Annual Meeting of the Rhode Island Pharmaceutical Association was held at Providence, January 18, 1904. Gilbert R. Parker, of ———, was elected President; Charles H. Daggett, of ———, Secretary. The following papers were read:

"On Some Causes of the Inefficiency of Certain Pharmaceutical Preparations," by George A. Wood.

"An Apparatus for Extracting Fats," by Franklin A. Strickland.

"On What is Pharmacy Coming To," by Charles H. Daggett. (*From Journals.*)

South Carolina.—The Twenty-seventh Annual Meeting of the South Carolina Pharmaceutical Association was held at Charleston, May 13-14, 1903. J. C. Mace, of Marion, was elected President; Frank H. Smith, of Charleston, Secretary and Treasurer. (*From Journals.*)

South Dakota.—The Eighteenth Annual Meeting of the South Dakota Pharmaceutical Association was held at Canton, August 11-13, 1903. F. G. Sickles, of Mellette, was elected President; E. C. Bent, of Dell Rapids, Secretary. The following papers were read:

"Analysis of Urine," by E. D. Jones.

"The Pharmacist and His Business," by R. Steensen.

"The Effect of Alcohol on the Human Body Scientifically Considered," by Dr. Abbie A. Jarvis.

"Percentage on Prescriptions to the Physician; What Are the Evils of Such Practice?" by E. P. Connell.

"Hints on Advertising," by J. C. Spaulding.

Interesting addresses were also delivered by Dean F. J. Wulling, of the School of Pharmacy of University of Minnesota.

Tennessee.—The Eighteenth Annual Meeting of the Tennessee State Druggists' Association was held at Monteagle, July 15-17, 1903, in five

sessions. J. H. Wilson, of Marlin, was elected President; E. F. Trolinger, of Bell Buckle, Secretary. The following papers were read:

"Shorter Hours and Sunday Closing," by W. D. Muse.

"Relation of Druggist and Physician," by T. J. Derryberry.

"Can a Pharmacist Manufacture his Own Non-Secret Preparations with Financial Success to Himself?" by Ira B. Clark.

"The Best Method of Preparing and Preserving Syrups of Hydriodic Acid and Iodide of Iron," by A. B. Rains.

"Practical Suggestions on the Business Side of Pharmacy," by J. A. Loyd.

"The Relative Status of Pharmacy as a Business and Profession," by E. W. Holcomb.

"Why a Druggist Should Handle Grape Juice, and How he Can Make it Pay to do so," by F. W. Smartt.

"What are the Best Methods of Advertising that Can be Adopted by the Retail Druggist?" by R. W. Vickers.

"Colloidal Metals," by E. A. Ruddiman. (*From Proceedings.*)

Texas.—The Twenty-fourth Annual Meeting of the Texas Pharmaceutical Association was held at Waco, May 19-21, 1903. J. J. Thames, of Taylor, was elected President; R. H. Walker, of Gonzales, Secretary and Treasurer. The following papers were read:

"The Pharmaceuticals I Make and Sell," by J. P. Hayter.

"Commercial Relations," by J. J. Thames.

An interesting address was also delivered by Col. Wm. L. Prather, the President of the University of Texas. (*From Journals.*)

Vermont.—The Tenth Annual Meeting of the Vermont State Pharmaceutical Association was held at Burlington, September 2-3, 1903, in four sessions. H. C. Pierce, of Barton, was elected President; W. E. Terrill, of Montpelier, Secretary. The following papers were read:

"On Vanilla Beans," by J. M. Dow.

"On Emulsions," by Z. B. Hopkins.

"On Drug Store Help," by E. A. Droun. (*From Proceedings.*)

Virginia.—The Twenty-second Annual Meeting of the Virginia Pharmaceutical Association was held at Buckroe Beach, July 14-16, 1903. G. T. Mankin, of Falls Church, was elected President; C. B. Fleet, of Lynchburg, Secretary. An interesting paper on the present "State Poison Law" was read by Dr. George E. Barksdale. (*From Journals.*)

Washington.—The Fourteenth Annual Meeting of the Washington State Pharmaceutical Association was held on board of the steamer "Queen," sailing from Seattle around Puget Sound, July 10-13, 1903. U. G. Wynkoop, of Tacoma, was elected President; W. P. Bonney, of Tacoma, Secretary. (*From Journals.*)

Wisconsin.—The Twenty-third Annual Meeting of the Wisconsin

Pharmaceutical Association was held at Waupaca, September 1-3, 1903, in five sessions. J. M. Farnsworth, of Beloit, was elected President; Henry Rollmann, of Chilton, Secretary. Interesting reports were presented by the Historical Committee and the Committee on Adulterations, and the following papers were read:

"Essence of Pepsin," by Joseph Herb.

"A Practical Remedy for the Growing Cut-Rate Evil," by J. M. Farnsworth.

"How Can Physicians be Discouraged in the Promiscuous Use of Proprietary Medicines?" by Otto J. S. Boberg.

"What is the Best Way to Overcome the Growing Evil of Physicians, Prescribing Proprietary Pharmaceuticals and other Proprietary Remedies?" by R. M. Bell.

"The Best Way to Secure a Greater Interest and a Larger Attendance at the Annual Meetings," by R. M. Bell.

"The Interior Arrangement of a Drug Store," by Carrie M. Sacker.

"What is Substitution?" by Ch. J. Sackstetter.

"Suggest a Way for Shortening the Hours of Work for Pharmacists," by Edwin A. Showalter.

"How Should a Retail Druggist Advertise his Business?" by C. A. Wakeman. (*From Proceedings.*)

PHARMACY.

A. APPARATUS AND MANIPULATIONS.

Weights and Measures—Absurdities of the Present System.—Dr. Bolink read a paper on "Weights and Measures" at a meeting of the Washington Pharmaceutical Association, in which he very interestingly points out some of the absurdities of our present system. This paper cannot be profitably condensed, and must therefore be consulted in the original in the *West. Drugg.*, Jan., 1904, 14.

Metric Equivalents—Convenient Table for Reference.—C. S. N. Hallberg, in view of the fact that in their daily practice pharmacists are forced to the makeshift of employing equivalents in the customary weights and measures for the metric quantities of the Pharmacopœia in the making of preparations, has devised the following table, showing the exact equivalents in customary weights and measures for metric preparations in a form convenient for ready reference, believing this to be more convenient and less confusing than the manner in which these equivalents are usually inserted in the text:

Grains.								
1,000	1 oz.	1 lb. av.	Grains.	Minima.	1,000			
Gm. Cc.	Apoth.	453 Grm.	1 pt., 16 fl. oz.,	473 Cc.	Gm. Cc.			
1	$\frac{1}{2}$	7	7.2	7.68	1			
2	1	14	14.6	15.4	2			
3	$1\frac{1}{2}$	21	21.9	23	3			
4	2	28	29.2	30.8	4			
5	$2\frac{1}{2}$	35	36.5	38.4	5			
10	5	70	73	76.8	10			
20	10	140	146	153.6	20			
30	15	210	219	230.4	30			
40	20	280	292	307	40			
50	24	350	365	384	50			
	av. oz.	grs.	av. oz.	grs.	fl. oz.	min.		
100	48	1	262	1	292	1	288	100
200	96	3	87	3	148	3	96	200
300	144	4	350	5	...	4	384	300
400	192	6	175	6	295	6	192	400
500	240	8	...	8	151	8	...	500

This table may be broken—that is, such portions as may be required for the percentage quantities of a special class of preparations may be indicated at the bottom of the pages of the U. S. P.; for example, thus:

PROPORTION LINES.

For tinctures—

Gm. in 1,000 cc.....	20	50	100	150	200
For 1 pint.....	146	635	1 oz. av.	2 oz. av.	3 oz. av.
	grs.	grs.	292 grs.	220 grs.	148 grs.

For spirits—

Cc. in 1,000 cc.	1	10	50	100	200
For 1 pint.....	7.68	76.8	384	1 fl. oz.	3 fl. ozs.
	min.	min.	min.	288 min.	96 min.

For powders—

Gm. in 100.....	1	2	3	5	10	15	20	30
For 1 oz. apoth. grs.....	5	10	15	24	48	72	96	144 grs.

For ointments—

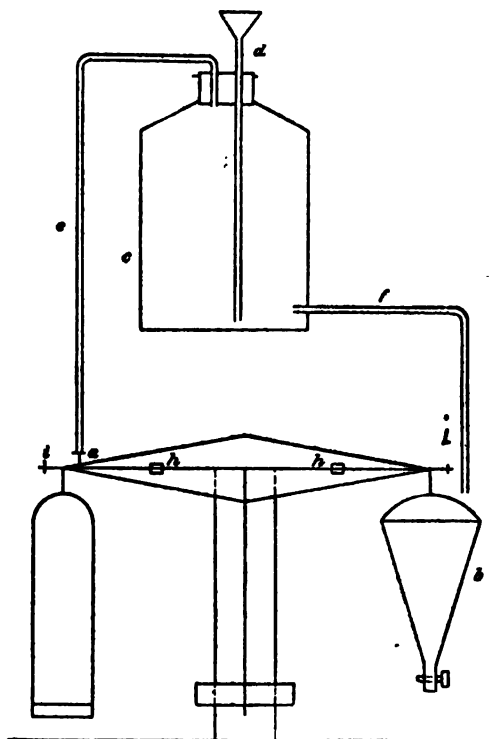
Gm. in 1,000 Gm.....	10	20	50	100	150	200	300
For 1 pound av.....	70	140	350	1 oz. av.	2 oz.	3 oz.	4 oz.
	grs.	grs.	grs.	262 grs.	174 grs.	87 grs.	350 grs.

So long as metric weights, measures and containers are not generally accessible, metric quantities are usually not desired, but prepared in the quantities for different classes of preparations as above indicated. For such these specimen "Proportion Lines" will be of convenience, and will also be of value as constant reminders of metric equivalents.—*Amer. Drugg.*, 44, No. 3 (Feb. 8, 1904), 73.

Automatic Balance for Weighing Fluids—A Simple Device—The "Deutsche Patent-Industrie Gesellschaft," has introduced the simple device shown by Fig. 1, by means of which it becomes possible to weigh

identical quantities of a liquid with a minimum of attention. It consists of an ordinary beam-balance, which is provided near the extremity of one of the arms with a rubber pad or a polished plate of glass or metal (*a*), the purpose of which is to close or open the mouth of the tube (*e*), admitting air into the reservoir (*c*); an ordinary scale-pan being suspended

FIG. 1.



Automatic Balance for Weighing Fluids.

from this arm for the reception of the weight, while from the other arm a conical glass or metal (*b*) provided with a stop-cock, is suspended for the reception of the liquid. The required weight having been placed on the pan, the valve (*a*) opens, air is admitted into (*c*), and the liquid begins to flow through the tube (*f*) into the receiving vessel (*b*) until the required weight is received, when, equilibrium being restored, the valve (*a*) closes the mouth of the tube (*e*), and the flow of the liquid ceases. The stop-cock on the tube (*f*)—not shown in the drawing—is thus closed, and the liquid is withdrawn from (*b*), when the weighing of liquid may be resumed in the same way. If for any reason the receiving vessel or the weight press has to be changed, the equilibrium of the two arms of the beam may be

adjusted by the sliding weights (*h h*), and, aided by the nut-screws (*i i*) at the extremities of the arms. The reservoir (*c*) is replenished from time to time through the funnel-tube (*d*).—*Pharm. Ztg.*, 49, No. 20 (March 9, 1904), 209.

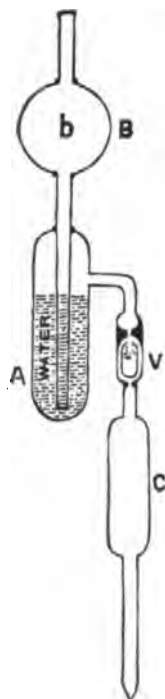
Normal Dropping Pipette—Construction and Accuracy in Use.—Dr. Frederick Eschbaum in conjunction with Prof. J. Traube has devised a

FIG. 2.



Normal Dropping Pipette.

Fig. 3.



Pipette.

Fig. 4.



Pipette.

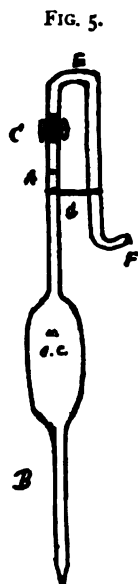
normal dropping pipette which enables the accurate dropping of different liquids. This instrument, which is shown by Fig. 2, is provided with a circular dropping surface of 3 Mm. diameter, and drops exactly 20 drops per gramme

(Cc. ? Rep.) of the fluid, whether it be watery or alcoholic. In use, the air-hole is closed with the middle finger, the rubber ball is pressed down with the index finger, the point of the pipette is inserted into the fluid and the pressure released until the bulbous extension of the long capillary tube is filled. The middle finger is now removed for a moment from the air-hole, immediately and firmly reapplied, and the pipette withdrawn from the fluid. By then gently turning the pipette the air-hole may be opened sufficiently to cause the emission of the fluid drop by drop, the size of which is dependent on the meniscus of the dropping surface and regulated in liquids of different density by the extra length of the capillary.—*Pharm. Ztg.*, 48, No. 64 (Aug. 12, 1903), 645.

Pipettes—New Forms for Drawing Fuming Liquids.—B. M. Mukerjee describes the pipettes shown by the accompanying cuts (Figs. 3 and 4), which he has used for some time with advantage for drawing bromine, chlorine water, etc., and which he has not seen previously described. The pipette (Fig. 3) consists of a reservoir, *A*, containing water; a tube, *B*, with a bulb, *b*, of about the same capacity as the reservoir, and passing nearly to the bottom of the latter; and a pipette, *C*, which, for greater safety, is provided with a valve, as shown at *V*, but may be, and is, often omitted. A simpler form is the pipette shown by Fig. 4. In this the U-tube serves the purpose of the reservoir of Fig. 3, but this form of pipette is not quite so convenient as the other. The use of these pipettes is obvious.—Chem. News, March 31, 1904, 161.

Pipettes—Convenient Attachment.—S. E. Dowdy suggests the attachment to pipettes, shown by Fig. 5, as a means of avoiding the admission of the fluid drawn into it into the mouth and for convenience and accuracy

in measuring. *A* and *B* show an ordinary straight pipette. *C* is a rubber connection closed by a burette clip; *E* and *F* a bent piece of glass tubing with a short, turned-up mouth-piece, shown at *F*, and *G* is a stout piece of copper wire, the ends of which are twisted around the mouth-piece tube and pipette, holding the two in position. In use, the pipette is held by the wire connection with one hand, the other being free to operate the clip. The clip being opened, suction is applied to the mouth until the fluid rises to a point beyond the graduation mark and the clip is then closed. Excess is then returned to the container and the liquid accurately adjusted to the mark by gently compressing the clip. The convenience is obvious, and the attachment inexpensive and easily constructed.—Pharm. Journ., May 21, 1904, 696.



Pipette Attachment.

Fig. 6.



Eye Dropper.

Eye Dropper—Stopper Combination.—A Berlin firm has introduced the eye dropper as shown by Fig. 6, which, doubtless because of its practical construction, is supplied under the distinctive name of "Practicus." Its advantages are so obvious that it needs little explanation. Being combined with a rubber stopper, when not in use it serves as a stopper for the bottle containing the eye drops, and is itself protected from pollutions resulting from dust and other causes incident to its use.—Pharm. Ztg., 48, No. 73 (Sept. 12, 1903), 746.

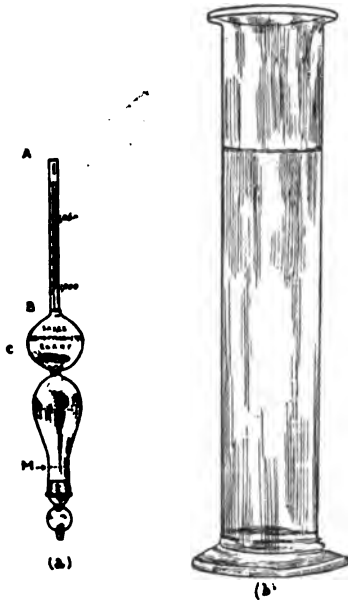
Specific Gravity—Raising of the Official Standard of Temperature.—Dr. A. B. Lyons gives the following reasons why the customary standard temperature for specific gravities, of 15°C ., is not a convenient one for the American pharmacist: "The temperature of the air in a chemical laboratory in this country rarely falls below 20°C ., at least during the working hours. The average temperature during the summer months, even in the northern states, is several degrees higher. In making delicate weighings care must always be taken to bring the temperature of the article weighed nearly to that of the air. It is particularly necessary that that temperature be above the dew point." On these grounds the author considers it desirable that the standard temperature at which specific gravities are to be taken be raised, so that these objections shall be practically eliminated. The most suitable temperature in the northern states would be about 22°C . In lower latitudes, and during the warmer weather of our northern summer, however, 25°C . is not too high, and this, on the whole, the author considers the best temperature to adopt. If the standard temperature of the U. S. Pharmacopœia is made 25°C . instead of 15°C ., the old calibrated apparatus (flasks, pipettes, burettes, etc.) can still be used, since it is the relative, not the absolute, capacity of these that is important. The pycnometers, of course, would have to be readjusted to the new standard, but this is easily enough done. All that is necessary is to remove with a sharp file or with an emery wheel just enough from the inner end of the glass stopper to make its capacity for water of standard temperature exactly what is marked on the bottle. If the bottle has a counterpoise, of course, the same amount must be removed from this. It may, however, be considered easier simply to attribute to the instrument a constant error, and correct all results obtained by a correction-factor provided in the U. S. P. This correction-factor will be practically the same, whether the standard temperature is taken as 15° or as 25°C ., and so it may be left optional with the individual whether he use the old standard or the new. In either case he will make the weighing at the prevailing air temperature, correcting by aid of the factor, the liability to error being somewhat less, generally, because the absolute amount of the correction will be less.—Merck's Rep., Nov., 1903, 315.

Specific Gravity—New Method Applicable to Small Quantities of Liquid.—Dr. G. A. De Santos Saxe describes a new method of taking specific gravities of small quantities of liquids, which is particularly applicable to urine examinations, and is effected by means of the instrument shown by Fig. 7, and designated by him as a

Urine-Pycnometer.—This instrument is based upon the old principle exemplified in such hydrometers as Nicoll's, which has a platform for weights at the stem, and Faillère's, which has a platform for weights over the bulb. The urine is placed into the hydrometer instead of the hydrometer into the urine, as in the instruments now in use. It consists of a

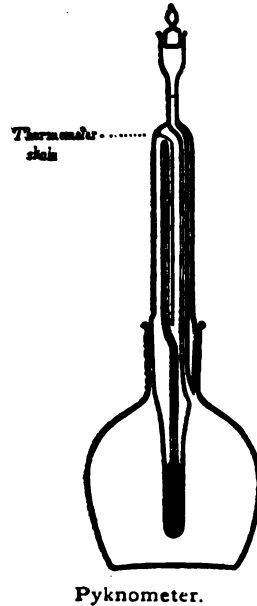
flask, *D*, bearing a mark, *M*, and stoppered with a ground glass stopper, *E*, whose handle is hollow and contains a tiny bead of mercury. A hollow bulb, *C*, and a stem, *A*, bearing graduations complete the instrument. The instrument is so made that when distilled water is poured into the

FIG. 7.



Urine-Pyknometer.

FIG. 8.



bottle up to the mark, and when the instrument is closed inverted, and dipped into distilled water, the stem stands at the 1000 mark, which is near the bulb. When urine is placed in the bottle, and is poured in accurately, up to the mark, the instrument will sink in distilled water in proportion to the specific gravity of that urine, and thus the scale will stand at a corresponding figure at the level of the water. In use, the bottle is held firmly, so that the circular mark at its neck comes at the level of the observer's eye. The urine is poured into this bottle by means of a pipette, taking care not to touch the sides of the neck of the bottle with the pipette. The lower meniscus of the urine must accurately touch the mark, and there must not be any drops of urine adhering to the inside of the neck of the bottle. Then the stopper is inserted, and turned so that it will stay in when the bottle is inverted. There is no danger of the stopper falling out while the instrument is in the water, inasmuch as the stopper is held in place by moisture and by the pressure of the water around it. The instrument is immersed in a small cylinder of distilled water, which, theoretically, should be at 15°C. , but variations in temperature, unless very marked,

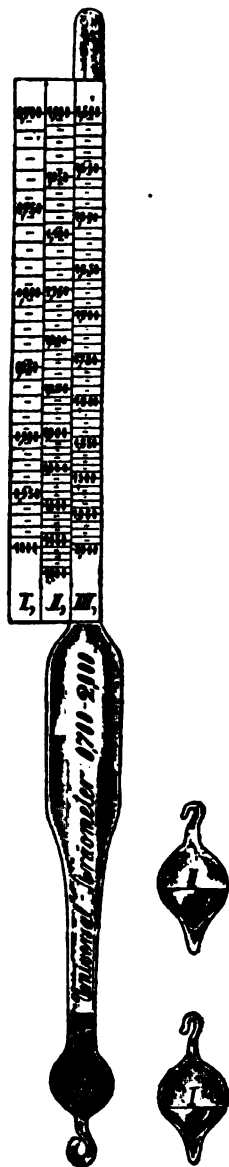
do not matter for practical purposes. The cylinder should be wide enough to avoid contact of the instrument with the walls, and the urino pycnometer should be twirled in the center of the water and allowed to settle before the reading is made, which is finally done by looking for the number on the scale corresponding to the level of the water, the lower meniscus being taken for the reading.—*Amer. Drugg.*, 43, No. 9 (Nov. 9, 1903), 268.

Pycnometer—A New Form.—S. Bosnjakovic has devised the new form of specific gravity flask shown by Fig. 8, which is admirably adapted to the determination of specific gravities within certain limits of temperature, being provided as shown with an accurate thermometer, and in other respects more convenient to handle than the instruments in ordinary use.—*Pharm. Ztg.*, 49, No. 46 (June 8, 1904), 483.

Specific Gravity Bottle—Simple Construction.—Dr. George F. Barksdale gives the following simple directions for constructing a specific gravity bottle suitable for ordinary pharmaceutical testing: Secure a two dram homeopathic vial, clean it well, dry inside and out. Now counterpoise it on the prescription balances by using small squares of tin-foil. When it is exactly balanced remove it and fold the tin-foil so that all the squares are made into a solid package, which should be compressed with a spatula. This makes a permanent counterpoise weight. Now replace the vial and weight, put exactly a hundred grains weight in the pan with the counterpoise, and then use distilled or rain water, at a temperature as nearly 60 degrees F. as possible, pour it in the vial until a balance is secured. Remove this vial, stand it on a level surface and paste a strip of paper—say one-eighth of an inch wide—so that the upper edge of the paper is exactly even with the upper ring of the meniscus. Pour out the water, allow the paper pasted on to dry, and then with a new triangular file scratch evenly along the upper surface or edge of the paper, afterwards washing the latter off.—*So. Drug. Journ.*, January, 1904, 207.

Universal Hydrometer—New Form.—Ulrich

FIG. 9.



Hydrometer.

has constructed the hydrometer illustrated by Fig. 9, which is simply a practical adaptation of a principle long recognized and in use. By providing the hydrometer bulb with a glass loop, and supplying additional weights in form of small bulbs (I, II) filled with mercury or shot, these can be attached by means of the hook-extension on the bulbs, and three or more scales, varying from 0.700 to 1000 for lighter liquids, and from 1.000 to 1.700 or 2.00 for heavier, may then be established, as shown in the drawing. These scales are distinguished by different colors, and, of course, fixed in the interior of the hydrometer stem.—*Pharm. Ztg.*, 48, No. 62 (Aug. 5, 1903), 627.

Standard Sieves—Necessity for More Accurate Definition.—As is well known, the U. S. Pharmacopœia of 1890 directs certain degrees of fineness of powder based upon the fineness of the wire cloth of the sieve through which the powder has been passed and dependent on the number of meshes to the linear inch of the wire cloth. Prof. Joseph P. Remington calls attention to the fact, however, that this definition is subject to variations and inaccuracy arising from the difference in the thickness of the wire used for making the wire cloth, and that therefore the U. S. P. should not only designate the number of meshes to the linear inch, but also the size of the wire used for making it, for the size of the mesh being taken from the centre of one wire to the centre of the one next to it there must necessarily be a difference, greater or less, in the actual opening through which the powder is to pass, according to the variation in the thickness of the wire. It is suggested that the standard adopted by the principal manufacturers of wire cloth be adopted as the standard for the U. S. P., this standard being as follows :

12-mesh, No. 24 wire.

20-mesh, No. 28 wire.

30-mesh, No. 31 wire.

40-mesh, No. 33 wire.

50-mesh, No. 35 wire.

80-mesh, No. 38 wire.

These grades of wire are well known, and uniformly recognized in the trade and manufacture.—*Proc. Pa. Pharm. Assoc.*, 1903, 114-116.

Percolation vs. Maceration—Comparative Experiments.—L. Schmitt reports the results of a series of experiments on the relative efficiency of maceration and percolation for the extraction of potent drugs, in accordance with the resolutions adopted by the Brussels Conference, to the French Pharmacopœial Committee. The percolated tinctures were prepared in the proportion of 1 : 10 with 70 per cent. alcohol, after two days' maceration; the macerated tinctures in the usual manner. An important outcome of the experiments showed that the percolated tinctures formed larger precipitates than those made by maceration. The extract was determined by evaporation and drying to constant weight; the acidity

by titration in aqueous dilutions of the tincture, 1 : 10 ; the sp. gr. in the usual manner ; the coefficients of precipitability by water, by noting the amount of water necessary to produce turbidity in 10 Cc. of the tincture. The following table will illustrate the character of the experiment :

Tincture (1 : 10 with 70 per cent. alcohol).	Sp. gr.	Extract.		Ash. Per cent.	Acid No. = KOH in 10 Cc. Gm.	Water Coefficient. Cc.
		Air dry. Per cent.	In exsiccator. Per cent.			
Aconite	0.9053-0.9058	2.694	3.161	0.134	0.00952	3.1
Belladonna	0.9011-0.9033	2.598	3.280	0.198	0.02575	2.7
Cantharides	0.9028-0.9030	2.300	2.493	....	0.01344	0.15
Colchicum Seed ..	0.8990-0.9000	1.717	1.984	0.134	0.00616	2.2
Digitalis	0.9015-0.9042	3.220	4.140	0.2275	0.02240	2.4
Ipecacuanha	0.8988-0.8990	1.735	1.850	0.082	0.00952	2.5
Hyoscyamus	0.9107-0.9109	2.164	3.265	0.642	0.01792	1.4
Nux Vomica	0.9025-0.9028	1.285	1.355	0.00215	0.00896	1.7
Strophanthus ...	0.8996-0.9007	1.639	1.761	0.128	0.00728	2.2

The figures comparing the above results with those obtained with preparation of the Codex are omitted, those here given affording interesting data simply concerned with the preparation and methods agreed on at the Brussels Conference.—Pharm. Ztg., 49, Nos. 10 and 28 (February 3 and April 6, 1904), 102 and 291 ; from Journ. Pharm. Chim., 1904, Nos. 1, 2, 3 and 4.

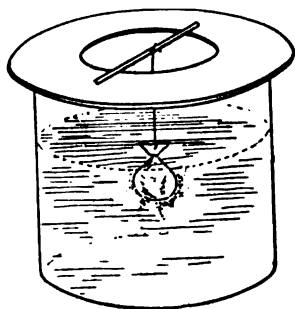
Percolation in the Codex—Rate of Flow.—According to Bourquelot the process of percolation adopted for potent extracts and tinctures for the future codex is distinguished from that of the Phar. Ger. by requiring a preliminary maceration of four drugs, and by not definitely fixing the rate

of flow (40 drops in a minute) as is done in the latter standard. The requirement of the codex will be, a slow percolation to complete extraction, so that within 24 hours not more than one and one-half times as much percolate is obtained as drug is employed for the preparation.—Pharm. Ztg., 49, No. 10 (Feb. 3, 1904) 102 ; from Journ. de Pharm. et de Chim., 1904, xix, No. 2.

Circulatory Displacement—A Timely Admonition—O. P. Sydenstricker calls attention to the general reliability of the method of circulatory displacement

which has in modern pharmacies fallen into practical disuse. The accompanying cut, Fig. 10, may, therefore, serve as a reminder of this process, which presents many advantages to the busy pharmacist in his daily occu-

FIG. 10.

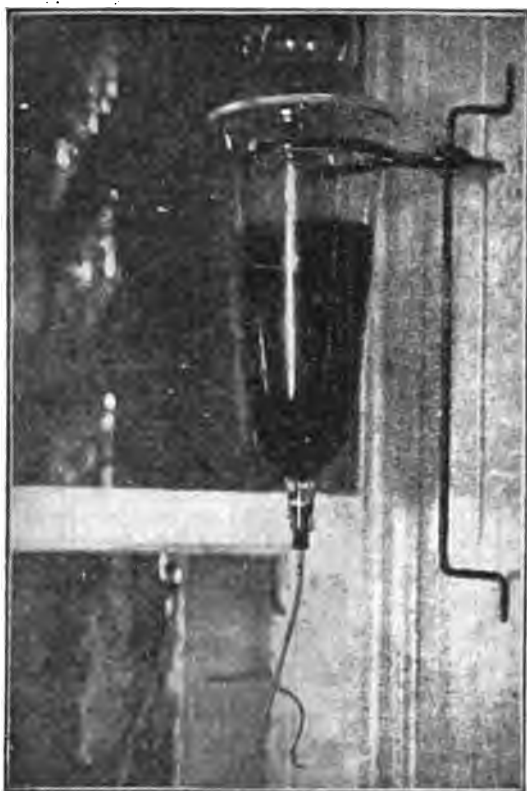


Circulatory Displacement.

pation. The drug or substance to be extracted or dissolved is placed on a porous diaphragm or sieve, or, in the case illustrated, a gauze bag, and is immersed in the solvent just below the surface. In this way the parts immediately in contact with the solvent are dissolved, the solution descends, and its place is taken by fresh solvent—a circulation being established and solution effected without further attention until completed. Many official preparations are thus far more conveniently prepared than by the ordinary methods, such, for instance, as tincture of iodine, mucil-

FIG. 11.

R.H.



Percolator Support.

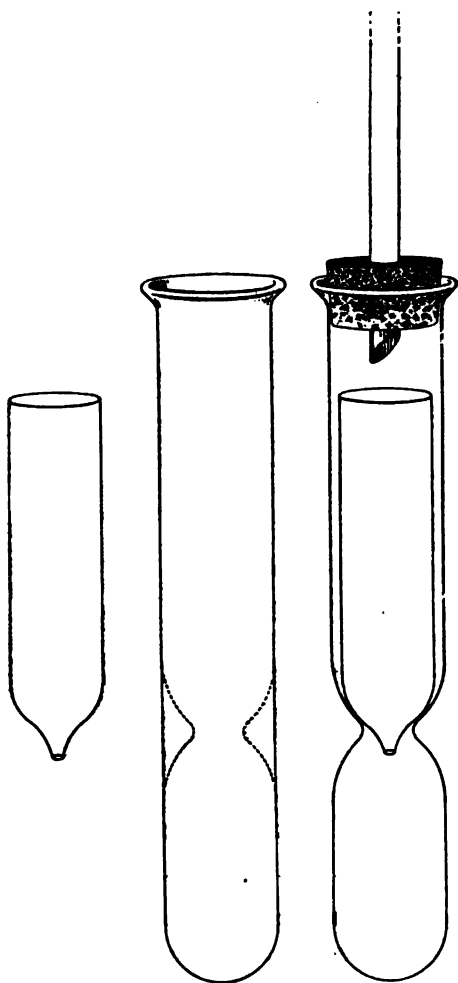
age of acacia, while saturated solutions of salts, which at best dissolve but slowly, are thus conveniently obtained without taking up valuable time.—*Amer. Drug.*, 43, No. 9 (Nov. 9, 1903), 269.

Percolator Support—A Simple Wall Device.—H. F. Ruhle finds the percolator support shown by Fig. 11 to afford a convenient substitute for the ordinary retort-stand. It is easily and cheaply constructed by any blacksmith from an iron rod of the same thickness as that used for retort stands and forms a permanent fixture when fastened by means of screws to the

walls of the laboratory. The support shown in the illustration is 16 inches long from bend to bend, extends about two inches from the wall, and is forged from a $\frac{5}{16}$ -inch iron rod.—Proc. Pa. Pharm. Assoc., 1903, 145.

Extraction Apparatus—New and Cheap Form.—Franklin N. Strickland has devised a very cheap and efficient small extraction apparatus,

FIG. 12.



Extraction Apparatus.

which he makes from a large test tube, as shown by the accompanying cut, Fig 12. The details of its construction are given as follows: A 7-inch by $\frac{7}{8}$ -inch or 1-inch test tube is held in the flame of a Bunsen burner, until one side at about two inches from the bottom of the tube is softened by the heat, then with the end of a file or other sharp-pointed instrument, a

pointed concave is pushed in ; the tube is then revolved until the opposite side comes into the flame and that heated and treated in the same manner, until the concaved points nearly touch each other upon the inside of the tube. Next, select a smaller tube which will fit loosely into the larger one. Heat the end of it in the flame until it is softened and with the file from the inside of the tube, push out the end until a cone-shaped point is formed somewhat like the end of a small percolator ; then grind off the tip end of this tube with the file, until a small orifice is the result. Next, insert the smaller tube within the larger, the cone point resting upon the concave points of the larger tube, its support, and decide upon an imaginary point where the smaller tube must be cut off so that its top shall come within about an inch to an inch and a half of the top of the larger tube. To cut off this tube, scratch it with a file, heat a piece of glass rod to redness and quickly place its heated end upon the scratch, when the upper part of the tube should readily crack off. The apparatus is completed by fitting the mouth of the large tube with a perforated stopper, through which is passed the end of a small Liebig glass condenser in upright position, or a long piece of glass tubing may be used instead. So constructed, the little apparatus is adapted for hot, continuous percolation in the extraction of some drugs for assay, taking the place of the Soxhlet and Hulsebosch percolator. It is especially useful in the estimation of fat in milk.—*Drugg. Circ.*, 48, No. 6 (June, 1904), 120.

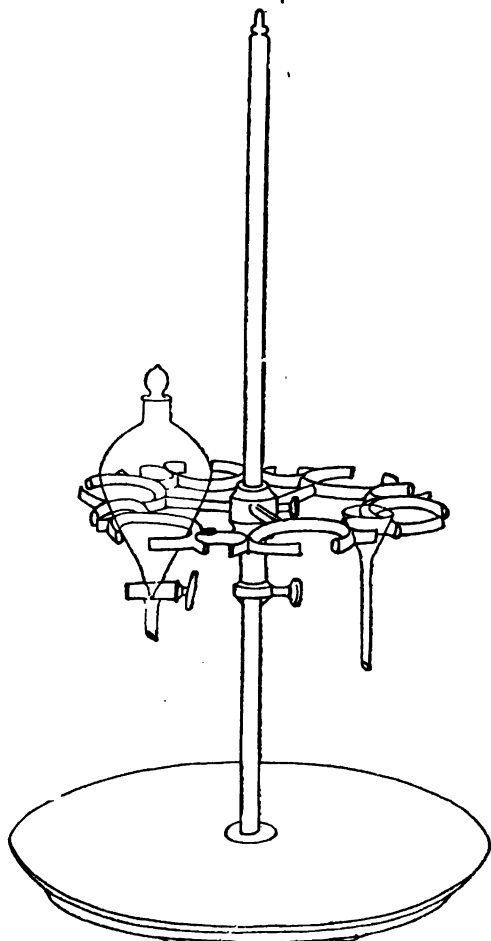
Separatory Funnel—New Form.—Dr. E. Thon describes a new form of separatory funnel, shown by Fig. 13, which eliminates some of the inconveniences experienced in the use of the ordinary form, such as the loosening of the stopper on shaking, or by concussions, and consequent leakage. In the new form the outflow and stoppage is effected by means of a hollow central stem, passing from the tubular in the top of the funnel into the neck of the same, at which points it is carefully adjusted by grinding. The stem is provided with three openings, one near the top, one just above the neck on the interior of the funnel, and one in the neck, in line with a slight bulging out on one side of the latter. A turn of this stem will place the opening in the stem into coincidence with the bulge in the neck, and cause the outflow of the liquid through the lower opening of the stem in the interior of the funnel, which is regulated by the air-hole near the top of the stem, the outflow ceasing again by a half turn of the stem, which is provided with a ring for facilitating this operation on its upper and outer end, and is, of course, also provided with a secure ground stopper. The liquid to be extracted and the solvent, are introduced through the stem, and, the stopper being inserted, the apparatus is ready for the process which is otherwise carried out as usual.—*Apoth. Ztg.*, 18, No. 68 (Aug. 26, 1903), 596.

FIG. 13.

Separatory
Funnel.

Separatory Funnel-Holder—A Practical Device.—Prof. L. E. Sayre calls attention to the separatory funnel-holder shown by Fig. 14, which was devised by L. D. Havenhill, of the School of Pharmacy of the University of Kansas, and appears to possess several practical advantages over the ordinary supports used for this purpose. Thus, the ordinary retort ring is not adap-

FIG. 14.



Separatory Funnel Holder.

ted to the support of separatory funnels because the stop-cock of the bottles often interferes with its insertion into the ring. In the improved holder this difficulty is overcome by the openings in the rings, which permit the removal or insertion of the separatory funnel with the utmost convenience and without interference with those on adjacent rings on the same stand. When two of these holders are used on a single upright, it is possible to transfer a liquid from any one of the funnels in the upper holder to any

funnel in the lower holder by simply rotating the holder until the desired funnels are in the proper position for the purpose. The facility with which the funnels may be removed for the purpose of agitating its contents, presents another great advantage which cannot fail to be appreciated by those having occasion to use the shaking-out process.—*Drugg. Circ.*, 48, No. 1 (January, 1904), 5.

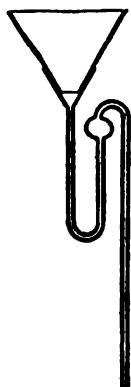
Filtration Before Dispensing—Practical Suggestions.—H. A. B. Dunning observes that experience teaches the advisability to filter all solutions and many mixtures before dispensing, for it rarely occurs that a liquid is so free from foreign matter, that it will not be improved by this operation. Absorbent cotton is well adapted for filtering or straining liquids, which are not of a syrupy or gummy character. For this class of fluids, when the straining is merely to remove small particles of solid foreign matter, gauze bunting or bandage gauze, will answer the purpose as well as the cotton, and require far less time. This gauze differs from ordinary gauze only in being more closely meshed. It may be bought in hundred yard rolls, one yard wide, at the cotton mills. It is a good plan to cut the gauze into strips one foot in width, and make into rolls of suitable size. These rolls should be kept convenient to the prescription counter. Any length desired may be readily clipped off with a pair of shears.—*Drugg. Circ.*, 48, No. 2 (Febr., 1904), 29.

FIG. 15.



Rapid Filtering Funnel.

FIG. 16.



Rapid Filtering Funnel.

Rapid Filtering Funnel—Improvement.—A. Guiggner has improved the ordinary form of quick-filtering funnel by providing an expansion immediately beneath the body of the funnel and by lengthening the capillary outflow tube as shown by Fig. 15. The improvement, it is claimed, greatly increases the rapidity of flow and has proven of great convenience in analytical work.—*Pharm. Ztg.*, 48, No. 83 (Oct. 17, 1903), 843; from *(Esterri. Chem. Ztg.*, 1903, No. 18.

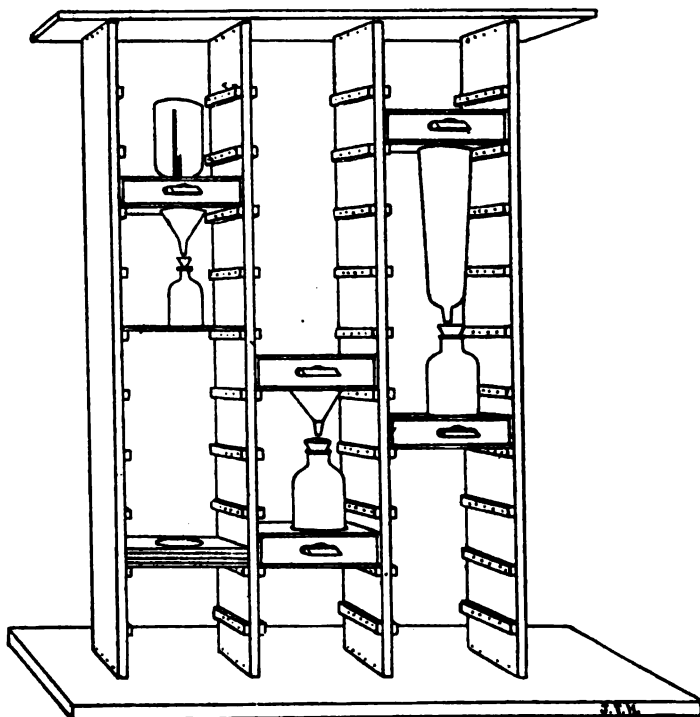
Rapid Filtering Funnel—New Construction.—Politzer has devised the rapid filtering funnel, shown by Fig. 16, for which he claims particular rapidity of action. This is determined by the increased length of the outflow tube and the interposition of the bulb, which, as soon as it is filled initially with the filtrate, causes suction comparable in effect with that of the suction-pump.—*Pharm. Ztg.*, 49, No. 20 (March 9, 1904), 209.

Wall Filter Rack—Convenient Construction.—Jos. F.

Hostelly describes the wall filter rack, shown by Fig. 17, constructed entirely of wood, which the druggist may fashion himself with few tools and at little expense. In a convenient locality in the back room

or laboratory, four smoothly-planed $\frac{3}{4}$ -inch boards, about 13 inches wide, are stood on end, about 13 inches apart, extending from the floor to the ceiling. Three-quarter inch strips might be nailed to the floor and to the ceiling with two-inch steel wire bunghead nails, to which the upright boards are nailed, or they can be made fast to the floor and ceiling by the same kind of nails driven in obliquely, the nails being "toed in" in the parlance of carpentry. Strips of wood, $\frac{3}{4}$ inch wide and $\frac{1}{2}$ inch thick, are strongly nailed to these boards equidistantly, about four inches apart along their

FIG. 17.



Wall Filter Rack.

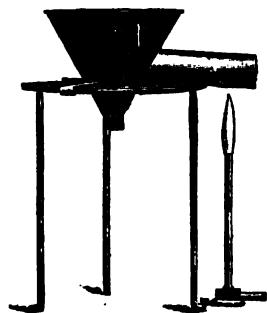
entire length, before being stood in position. These numerous strips are fastened to both sides of two of the boards and to but one side of the other two. These strips are to support shelves for filters and filtrate receivers, and must be exactly opposite each other to the eighth of an inch when the boards are stood up. The filter shelves are portable and enclosed, boxes in truth. They are fashioned of $\frac{3}{8}$ -inch boards, and are about 13 inches square by 3 inches deep. The funnel or percolator sets in the box, the latter supported by the cleats at a desired height, the greater portion of the filter projecting below the box-shelf through a circular opening in the bottom. The top of the box is a sliding lid. Were the lid hinged it could not be raised to enclose a filter, or to give it any attention required.

The opening in the bottom of the box is about $9\frac{1}{2}$ inches, diameter measurement; this will properly support either a one gallon or a one-and-a-half gallon funnel. A false bottom for each box-shelf is provided, that will slip into the box and lay on the true bottom, in which an opening about $6\frac{1}{2}$ inches in diameter is cut, making provision for the support of one and two quart funnels and one gallon percolators. Several of these false bottoms are shown in the sketch, laying one atop another across two cleats. One or two solid shelves of one board, with cleats properly nailed to the edges to anticipate warp, are also here, on which to stand filtrate receivers in short operations. The boxes or filter shelves may also be provided with shallow pans of enameled ware to catch any overflow if for any reason it may be necessary to allow percolation or filtration to go on with long intervals of supervision.—*Drugg. Circ.*, 47, No. 8 (Aug., 1903), 158.

Rack for Glass Funnels—Simple Construction.—W. O. Frailey uses a simple rack for glass funnels, which is constructed as follows: A facing strip, $2\frac{1}{2}$ inches wide, is fastened between each tier of shelves in the laboratory. In this holes are bored at an angle of 45 degrees and pieces of round bamboo inserted, on which the funnels hang conveniently and securely.—*Proc. Pa. Pharm. Assoc.*, 1903, 173.

Hot-Water Funnel—Improved Form.—The firm of L. Hormuth, of Heidelberg, has introduced an improved form of hot-water funnel, which is shown by Fig. 18. The improvement consists in providing two horizontal supports on a plane with the heating tube, by means of which the funnel may be placed upon an ordinary tripod, ring or other support that may

FIG. 18.



HOT-WATER FUNNEL.

be conveniently at hand. These horizontal supports are, moreover, of sufficient length to enable the use of large tripods, thus permitting the introduction of receiving vessels of various dimensions beneath the outflow of the funnel.—*Pharm. Ztg.*, 48, No. 83 (Oct. 17, 1903), 843.

Funnel-Bath—Cheap Construction.—Wilbur L. Scoville says that a convenient and cheap funnel-bath may be made by cutting off the sloping top of a gallon or two-gallon tin can, at a suitable height, then fitting a stopper to its neck and boring a hole in the stopper with a rat-tail file to fit the stem of the funnel. On inverting the can top and fitting the funnel into it by means of the perforated stopper, the space between the funnel and the tin will serve as a bath, and can be used for either chilling the funnel with ice and salt, or for hot filtration by filling with hot water, which may be kept hot by a burner or lamp.—*Drugg. Circ.*, 48, No. 5 (May, 1904), 94.

Thermometers—Construction on Fahrenheit's Scale.—In a brief historical review of the early attempts to construct instruments for the measurement of heat, we are reminded by Gustavus Pile that the thermometer was not given practical form until less than two hundred years ago, and that after the initial invention of Doctor Santorio, of Padua, of a crude air thermometer, devoid of a scale, in the early part of the 17th century, it was not until 1709 that Römer conceived the use of mercury, while it was not until 1724 that a scale having fixed and definite points of graduation, was invented and introduced by Fahrenheit. It is well known that Fahrenheit, taking boiling water to indicate one point and melting ice the other, he divided the space into 180 equal parts, and the selection of these two points has proven a very wise thing, which will always remain to his credit. It is not so clear, however, what object Fahrenheit had in view when he fixed the zero point 32° below the freezing point, and this remains a puzzling speculation to the present day. Mr. Pile, having an experience of many years in the construction of thermometers, gives some highly interesting information concerning the details connected with thermometer-making which is not generally available in text books. In making a thermometer of assured accuracy, it is of primary importance to select a piece of tubing that has been evenly drawn throughout its length; the bore must be of even diameter throughout, a fact which is determined by introducing a small amount of mercury, just enough to make a short length, and then, moving it slowly from one end of the tube to the other measuring it as it travels along. If it remains the same length during its entire course, it is fit for use. A bulb is then blown at one end to hold the mercury, this being an operation that requires both judgment and skill, and another bulb at the opposite end of the tube for the purpose of filling, this being accomplished by the aid of a small funnel. On applying heat to the lower bulb to drive out a portion of the air, a portion of the mercury descends into it on cooling; it becomes partially filled with mercury, and heat being now applied to the bulb till the mercury boils and is driven out, all traces of air and moisture are driven out with it. On cooling, the mercury is drawn into the bulb, which it completely fills; but if on standing any air-bubbles appear, the operation of heating and cooling has to be repeated, so as to assure the complete expulsion of the air. When the thermometer has thus been properly filled the upper bulb is cut off and the tube drawn out to a fine point; it is then placed in a liquid heated to the temperature that its extreme height is to indicate, and after all excess of mercury has escaped it is sealed in the flame. The thermometer is now complete for graduation, but this is not done at once, since the mercury column in the newly-made instrument shows some degree of contraction after being laid aside, this amounting to as much as a degree or two in the course of a year. Hence the thermometer is laid aside for a certain time *to season* before gradua-

tion. The latter is accomplished by introducing the seasoned instrument into a vessel of finely-broken ice and allowing it to remain until the column of mercury no longer recedes, this point being marked on the bulb with a fine file. The boiling-point is ascertained by placing the thermometer in a jacketed vessel, which is filled and surrounded with steam supplied by boiling water in the bottom of the inner section, and after sufficient time has elapsed to allow the whole to become thoroughly heated the height to which the mercury has risen is pointed off as before and the instrument laid aside to cool. In this connection it must be observed that while the situation of the freezing-point is easily determined with accuracy, water containing ice remaining at the same temperature as long as there remains any ice to be used up, the boiling-point is ascertained with more difficulty, the density of the atmosphere or barometric pressure, the purity of the water, the nature of the vessel, etc., producing deviations which must be taken into account by the maker who desires to produce reliable instruments. But having ascertained these two points and assured uniformity in the calibration of the thermometer tube, it only remains to divide the space between the two points into 180 parts, numbering them from 32 to 212, and similarly dividing a measured length downward from the freezing-point to the zero, or below. For ordinary thermometers, however, it is not customary to use calibrated tubes; but to obtain satisfactory results several intermediate points are taken with the aid of a standard instrument and the required divisions made between them—the points generally selected being 32°, 92°, 152° and 212°, making 60 divisions between each section, while for more accurate work divisions of 30° each are pointed off. The great discrepancy found in the thermometers made up for the trade is from the fact that these intermediate points are not observed; a top and a bottom degree only are pointed off and the rest of the scale has to take chances for correctness. But if on trial these—the freezing and boiling-points—should not register correctly, one can rest assured there is very little probability of any other part being of much value. In selecting a thermometer, also, the complete absence of air should not be overlooked, this being readily determined by inverting the instrument or giving a few taps on the end, when, if free from air, the mercury will completely fill the tube and show an empty space in the bulb, which disappears again on resting the instrument to its proper position.—*Amer. Journ. Pharm.*, 76, No. 2 (Feb., 1904), 51-55.

Melting-Points—Pharmacopœial Methods of Determination.—In a preliminary report respecting the melting-point determinations of the B. P., Leonard Robbins observes that while it is impracticable in many cases to ascertain the exact melting-points without employing quantities of the substance which would be wholly out of the question, it is obviously desirable to secure the highest possible degree of uniformity in the method em-

ployed. At the same time it is important that the apparatus and the manipulation should be as simple as possible. A method of melting-point determination which is now employed in some cases, and which, as nearly as possible, appears to constitute a theoretically satisfactory mode, consists in introducing a tube containing some 15 to 20 Gm. of the substance to be experimented upon into a thermostat, which has been heated previously to a temperature of 1° or 2° above the melting-point of the substance (as already approximately ascertained by means of a preliminary experiment on a small quantity), and which is maintained at that temperature during the experiment. The substance is stirred throughout the whole period occupied by its liquefaction by means of a thermometer, on which the temperature is read at frequent intervals. So long as there is present in the tube an intimate mixture of the substance in the liquid state with a quantity of the unmelted solid, the temperature, as indicated by the thermometer, is found to remain constant; and this temperature, which frequently remains constant for a period of several minutes' duration, may be regarded as the true melting-point of the substance, just as the temperature of an intimate mixture of ice and water which is kept constantly stirred is the true melting-point of ice. With regard to the official instruction for the determination of the melting-point, it would seem preferable to require the due preparation of the substance to be operated upon, by thoroughly drying it by a described process prior to testing it, while the application of a correction to the observed melting-point on account of the fact that the whole mercury column in the stem of the thermometer does not possess the same temperature as the mercury in the bulb, might for all practical purposes be avoided by the requirement that the Centigrade thermometer to be employed for the determination of melting-points shall be of a certain specified length between the points marked 0° and 300° respectively: that it shall be immersed to a specified depth in the hot liquid when a melting-point determination is being made and that, prior to its being used, it shall have been compared with a standard thermometer and provided with a table of corrections.—Pharm. Journ., March 5, 1904, 326.

Melting-Points—Simple Means to Insure Fairly Accurate Results.—S. Judd Lewis, in the hope of encouraging the more general practice of determining melting-points by pharmacists, discusses the subject from the practical standpoint, and gives such directions as will insure fairly accurate results by simple means. Unfortunately authorities do not agree upon what phenomenon shall be taken as indicative of the temperature of change of state. That at which the substance passes from the solid to the liquid condition is theoretically identical with that at which the reverse change occurs, but the temperature of solidification is much more subject to conditions than is the melting-point, therefore the latter is generally preferred. Referring to the author's original paper for the particulars and

details, the following process is one that is probably most useful for general purposes: Two-thirds fill a 400 or 500 Cc. beaker (tall shape) with water, melted paraffin, castor oil, or other suitable liquid, and raise its temperature to about 5° below the melting-point of the substance. Finely powder a little of the substance, and, if necessary, dry it; place some of it, to the depth of about 1 Cm., in a capillary tube of 1 Mm. bore, and shake it down well. Attach this to a thermometer by means of platinum wire or twine or (if water be used for the bath) a rubber ring (obtained by snipping it from a piece of small tubing), so that the substance is level with the middle of the bulb of the thermometer and in contact with it; immerse this in the heated bath to a depth of about 3 Cm. from the bottom of the beaker, and raise the temperature during three or four minutes to within half a degree of the melting-point of the substance, somewhat quickly at first, then more slowly; finally, during one or two minutes more, very gradually increase the temperature to the melting-point, read the thermometer, and apply the correction for the emergent column, as directed in the *Pharmacopœia*. The liquid in the beaker must be continuously and vigorously stirred, especially during the last two or three minutes. Precision is, of course, impossible if the thermometer graduations are inaccurate or cannot be corrected, and it is not often practicable to have a set of thermometers, all with Kew certificates. There are two other courses open—(1) to have an instrument 0° to 200° C. so certified, and use it only for standardizing other instruments from time to time, and not for the actual experiments, as it is the frequency with which a thermometer is used that alters the value of its readings; (2) to standardize and calibrate the thermometer (a good account of the method is given in “Heat for Advanced Students,” by Edser). For temperatures above 100° C. a thermometer whose lowest reading is about 100° C. should be used, otherwise the exposed column will be so long that the correction will be too great to be trustworthy. Where possible, short-range thermometers, graduated in fifths or tenths of a degree, should be used, but for most practical purposes a thermometer graduated in single or half degrees is all that is necessary.—*Pharm. Journ.*, Mar. 19 and 26, 1904, 398 and 429.

In this connection a number of interesting opinions concerning the B. P. method of determining melting-points—by Prof. Stanley Kipping, C. Simmonds, D. Lloyd Howard, Prof. Wm. A. Tilden, Messrs. Helbin and Passmore, and Prof. F. B. Power—have been communicated to the *Chem. and Drugg.*, Mar. 12 and 19, 1904, 434 and 479.

Melting-Points—Practical Method of Determination.—H. A. B. During finds the following method for the determination of the melting-point of fats, waxes or paraffin, to be quite accurate and convenient: Supposing the melting-point of a sample of paraffin is desired, small pieces of the sample about the size of a two-grain quinine pill are pinched off and manipulated by the fingers until the length is nearly twice that of the

diameter. One of these little masses is pressed along the side of the mercury bulb of a thermometer, the thermometer is immersed in water, preferably contained in a 4-ounce beaker, which is then gradually heated until the paraffin mass leaves the bulb of the thermometer, and rises to the surface of the water. The temperature at which the paraffin rises having been noted as nearly as possible, the water is allowed to cool one or more degrees and a new trial is made with another paraffin mass. This procedure is repeated until the water is just sufficiently warm to cause the surface of paraffin adhering to the thermometer to melt, thereby allowing the mass to rise to the surface of the water. The degree registered on the thermometer when this takes place is, of course, the melting-point of the substance which is under examination.—*Drugg. Circ.*, 48, No. 2 (Febr., 1904), 29.

FIG. 19.



FIG. 20.



Water-Baths.

Autoclaves—Proposed Methods of Recording Temperature.—Various devices have been adopted in order to prove that substances heated in an autoclave have really attained the desired temperature, as indicated by the pressure-gauge in connection with the machine. Thus, fusible metal melting at the desired temperature may be immersed or surrounded—*e. g.*, by the surgical dressings it is desired to sterilize. Demande now suggests the use of a series of definite chemical substances, colored by aniline dyes to be readily distinguishable. Thus, one may use benzonaphthol, colored yellow, melting at 110°C .; benzoic acid, colored green, melting at 121°C ., and urea, colored violet, melting at 132°C . Presumably, these substances would be inclosed in tubes, suitably disposed among the contents of the autoclave.—*Pharm. Journ.*, Nov. 21, 1903, 786; from *Rep. Pharm.*, 1903, 6.

Water-Baths—Improved Method of Heating.—An improved water-bath for small laboratory operations, introduced by L. Hormuth, is shown in two forms by Figs. 19 and 20. It consists in providing a protecting mantle or

jacket, raised sufficiently above the table by means of three short, stout legs riveted securely to the bottom, as shown in Fig. 19, and notched at the top so as to permit the free circulation of air, this serving as the support of a constant level or other form of water-bath. Instead of the short legs these may be extended so as to form a support for a Victor Meyer cover funnel, as shown by Fig. 20. The source of heat is an ordinary Bunsen burner, which is introduced laterally by a slit not shown in the drawing. Similarly, the constant level water-bath is held securely in place by means of a slit extending downward from the upper rim. The practical advantages are that the operation may be conducted even before an open window without danger of extinction of the flame, which may be observed through a little opening in the mantle, and that heat may be accurately and economically regulated.—*Pharm. Ztg.*, 48, No. 83 (Oct. 17, 1903), 843.

Aluminium-Bronze Evaporating Dishes—Utility in Analytical Operations.—E. W. Lucas finds the evaporating basins of aluminium-bronze now supplied to answer admirably in place of platinum vessels in many analytical operations, and more particularly for the evaporation of vegetable solutions in the course of the pharmacopoeial examinations of tinctures, fluid extracts, etc. With ordinary precautions the loss in weight by prolonged use is but trifling. In actual practice, during the use of a number of such basins, weighing from 56 to 58 Gm. each, the loss after four months varied from 2 to 9 milligrams. They were used on an ordinary water bath or in a copper oven, and cleaned with spirits and water, afterwards polishing with a soft leather. These bronze basins cannot, of course, take the place of platinum basins in operations involving the use of acids or alkalis.—*Pharm. Journ.*, Sept. 19, 1903, 432.

Protecting Hood for Evaporating Liquids—Practical and Convenient Form.—In place of the inverted funnel protection of evaporating liquids in water-bath operations, which require the use of special supports, the protecting hood shown by Fig. 21, is now proposed and supplied by W. Haldenwanger. It is constructed of porcelain and, as, shown, provided in its interior with three supports, sufficiently large to fit and rest on the rim of capsules of different dimensions, while the bended neck prevents the introduction of dusty particles from above, which, in the straight-necked glass funnels ordinarily employed is unavoidable. A further advantage is that the vapors may be carried off by connecting the neck of the hood with a flue leading into the outer air—the dimensions of the several parts of the hood being such as to facilitate the circulation of air from beneath and thus the carrying off of the vapors.—*Pharm. Ztg.*, 48, No. 98 (Dec. 9, 1903), 991.

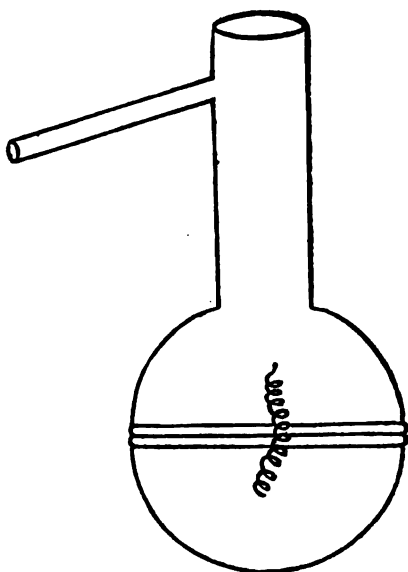
FIG. 21.



Protecting Hood.

Distillation Flasks—Novel and Convenient Construction.—In order to facilitate the cleaning and removal of solids from distillation flasks after extractions with volatile solvents, John McDonald has constructed such

FIG. 22.



Distillation Flask.

FIG. 23.



Boiling Flask.

flasks in two parts, which are ground together. In the flask shown by Fig. 22, the inner edge of bottom half has six small studs of glass projecting up about one-eighth of an inch above the rim, and the upper part just fits over these studs, and has its ground edge fitting on the ground edge of the under half. The studs are to prevent the two halves from slipping off each other, these being held together by three spiral springs fixed on to glass hooks placed at equal distances from each other on both parts, the tension of the springs entirely preventing leakage.—Chem. News, July 10, 1903, 16.

Boiling Flasks—Improved Joint to Condenser.—W. Bertram has devised boiling flasks with short conical necks which when ground into the corresponding opening of reflux condensers of any devised form afford a secure joint and at the same time many conveniences in handling, such as the removal of the flask, its readjustment, etc. The accompanying cut (Fig.

23) is self-explanatory. The principle is adaptable to flasks of any desirable form, as it is to any form of condenser.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 135.

Bumping—Simple Method of Prevention.—According to Horace Scudder, a single capillary tube, when used according to the directions given below, will stop most cases of bumping that occur in ordinary laboratory work. The method is simple, effective and introduces into the liquid no foreign substances except glass and one bubble of air. The capillary is made by drawing out a piece of glass tubing until the internal diameter is about 0.5 to 1 Mm. A seal is then made by holding the tube horizontally in the edge of the flame of a Bunsen Burner, until the walls have melted together. The tube is bent, if necessary, or held horizontally till cold. For most purposes the seal should be about 1 Cm. from the open end of the tube. The tube is cut off at the desired length and the other end sealed to prevent the entrance of liquid. When cold, the tube is placed open end down in the liquid to be boiled. The open end should rest on the bottom of the vessel containing the liquid, and should remain there during use. When liquids of high specific gravity are being boiled, it is necessary, therefore, to have the capillary so heavy that it will not be thrown off the bottom. This weight can be obtained by drawing out the tube from which the capillary is made only near the seal, or by using a very thick-walled tube. In a general way, the theory of the action of such a tube is, that when heated the air in the capillary expands and passes through the liquid in bubbles. The vapor of the liquid gradually replaces the air, and the stream of bubbles is continuous as long as the temperature around the capillary is at the boiling-point of the liquid. This constant bubbling prevents superheating and consequent explosive boiling. It is apparent that the size of the bubble will depend chiefly on the width of the capillary. This should vary with the nature of the liquid. For liquids of low boiling-point or for frothing liquids, a narrow capillary is best, while for heavy liquids a wider capillary (even as wide as 5 Mm. internal diameter) is more suitable. When boiling with a return condenser, the seal of the capillary *must* be below the surface of the liquid. If the seal is above the surface, cold drops falling back from the condenser will strike the capillary and cause condensation of the vapor inside, thus stopping the stream of bubbles. The capillary is useless if completely filled; therefore, it must be cold and empty when placed in the liquid.—Chem. News, Nov. 13, 1903, 242; from Journ. Amer. Chem. Soc., XXV. (1903), No. 2.

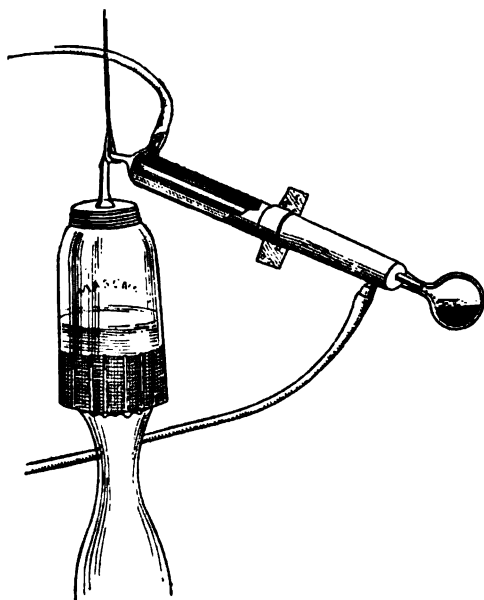
Still and Condenser—Cheap Construction.—C. R. Ambrose constructs a still from an ordinary tin oil can of 1 or 2 gallon capacity by unsoldering the seam in the flame of a spirit lamp so as to remove the conical top, which then serves as the still head. A Liebig's condenser (see Fig. 24)

is then made as follows: Take 3 feet of $\frac{1}{2}$ -inch glass tubing and bend 3 or 4 inches of one end at an acute angle. Take $1\frac{1}{2}$ feet of 1-inch water pipe, fit corks in each end, bore these corks and pass the long arm of the glass tube through the iron tube. Now at lower end, upper side, make a small hole for the entry of a tube to convey cold water. At the upper end place a small outlet tube and the condenser is finished. Pass the short end of the glass tube through a cork in the large hole of the conical top; place substance to be distilled in body of can, put on top and lute connections if necessary, apply heat, start cold water through condenser, and place a large bottle at the end to catch distillate. The apparatus so improvised will do for distilling water, recovering alcohol, or the preparation of aromatic waters. For the latter purpose, the drug is put in a cloth, suspended by means of a string immediately above the water, and the steam arising from the latter when boiling thus passed through it.—*Amer. Drugg.*, 43, No. 4 (Aug. 24, 1903), 95.

Still and Condenser—Simple and Inexpensive Construction.—Thomas R. Baker describes the simple and inexpensive still and condenser, suitable for class-room and amateur purposes, shown by Fig. 25. The still



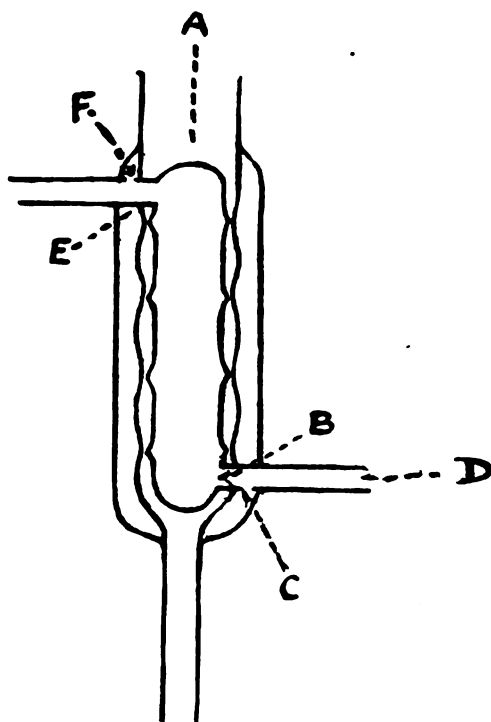
FIG. 25.



Still and

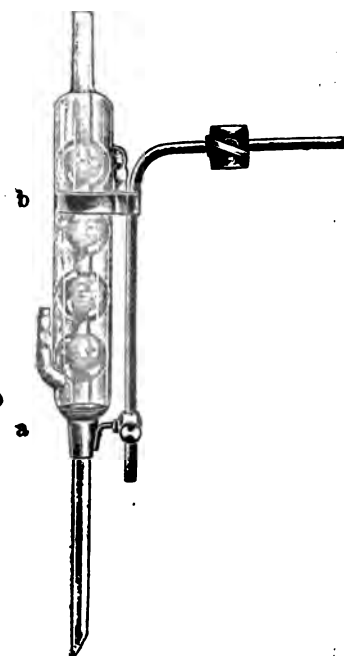
is a Mason fruit jar, with an all-zinc top, from which the porcelain disc is broken out. The distillate tube is a piece of $\frac{1}{2}$ -inch tin-lined lead pipe, about 3 feet long, one end curved at a somewhat acute angle with the long section, which is fitted into a hole made through the top of the zinc cover, and soldered to the cover. This tube is passed through a tube made of tinned iron, or other sheet metal, about $2\frac{1}{2}$ feet long and 2 inches in diameter. The ends of the large tube are closed about the smaller one by passing the latter through holes in stoppers fitted to the ends of the

FIG. 26.



Double-Surface Condenser.

FIG. 27.



Vertical Condenser.

large one. The large tube has short lateral tubes at its ends, for the admission of water at the lower, and exit at the upper end. The bottom of the fruit jar should be protected with a piece of wire window screen, to distribute the heat; the source of the latter being an ordinary kerosene lamp. The condenser may conveniently be permanently attached to the woodwork of a window, so that the distillate receiver may be opposite one of the window panes.—*Amer. Drugg.*, 43, No. 11 (Dec. 14, 1903), 329.

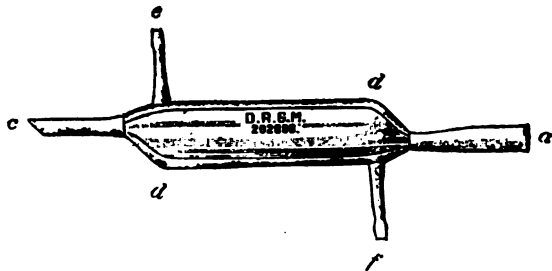
Double-Surface Condenser—Superiority over the Ordinary Form.—E.

Dowzard calls attention to the advantages of the all-glass double-surface condenser, shown by Fig. 26, which, although the body is only four inches long, possesses an efficiency that is in excess of all ordinary analytical requirements. The details are as follows: *A*, is the condensing chamber; *B*, the inlet to inner cylinder; *C*, the inlet to outer cylinder; *D*, the inlet for water; *E*, the outlet to inner cylinder; *F*, the outlet to outer cylinder.—Pharm. Journ., Feb. 27, 1904, 273.

Vertical Condenser—Improved Holder.—Dr. Lendrich has devised the adjustable condenser-holder shown by Fig. 27, which possesses the advantage that the condenser may be with ease and rapidity removed or changed when necessary or desired. The condenser rests in the socket *a*, which may be raised and lowered at will, being held in position by means of a thumb screw. The arms shown at *b*, serve the simple purpose of sustaining the condenser in a vertical position, and offers no impediment to its removal when such is required.—Apoth. Ztg., xviii, No. 56 (July 15, 1903), 491.

Reflux Condenser—New Model.—The condenser shown by Fig. 28 is constructed of glass on a model which assumes compactness with a maximum of cooling surface. It is particularly designed as a reflux condenser,

FIG. 28.



Reflux Condense:.

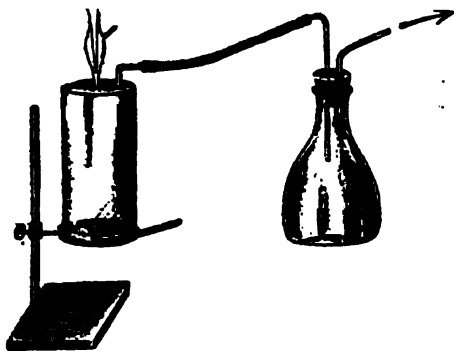
but may, of course, be used for ordinary distillation with the same advantage. The cut is self-explanatory.—Pharm. Ztg., 48, No. 98 (Dec. 9, 1903), 991.

Warm Water—A Convenient and Constant Supply.—Hansell Crenshaw says that a simple and economical apparatus for warming and keeping a supply of warm water exists, ready-made, in most city drug stores, in the form of an ordinary incandescent electric bulb. All that is necessary to keep a supply of warm water on hand is to lower one of these bulbs into a suitable bowl or bucket of water, and then turn on the electric current. The water will in no way injure or interfere with the light, and within a few minutes its temperature will be raised to 110° F., or considerably

higher, according to the size of the bulb and the quantity of water. By using two or more bulbs in the same vessel, very warm, or even hot, water may be obtained.—*So. Drug. Journ.*, Sept., 1903, 124.

Water-Air Blast—Economical Construction.—The economical air-blast (shown by Fig. 29), may be constructed with the simple material found in most laboratories. It consists of a tin can which is connected with the water supply through an opening in the top; a second opening

FIG. 29.



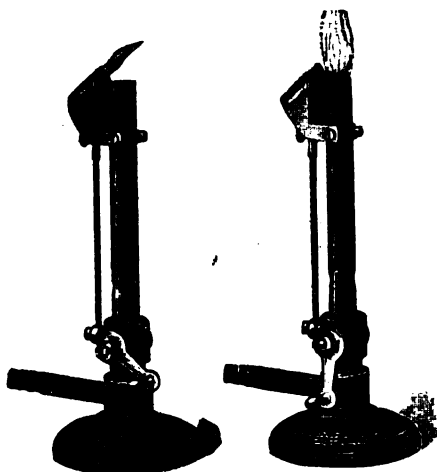
Water-Air Bath.

carries a bent-tube uniting the can with an empty bottle, having an exit tube of suitable dimensions, from which air is expelled on turning on the water, with more or less force according to the pressure in the supply-pipe.—*Pharm. Ztg.*, 49, No. 20 (Mar. 9, 1904), 209.

Bunsen Burner—Self-Lighting Attachment.—H. Schimmel has devised

FIG. 30.

FIG. 31.

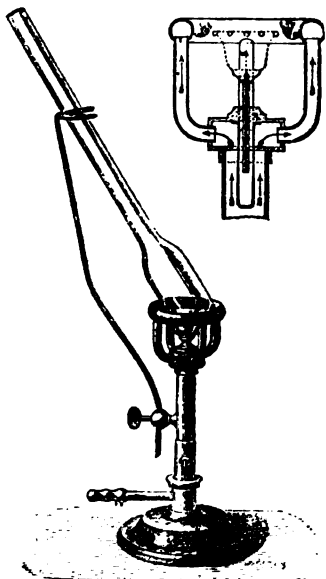


Bunsen Burner.

an attachment for Bunsen burners which obviates the necessity of turning down the flame during the periods when the burner is not in use. The attachment consists of a capillary tube, surmounted by a small pallet of spongy platinum, which is supplied with gas by means of a two-way cock when the flame in the burner is turned off. As soon as the gas reaches the spongy platinum, this begins to glow, the gas is ignited, and a very small flame is produced—the platinum pellet being protected by a hood from possibly overflowing liquids when the burner is in use. On turning on the flow of gas in the burner, this is immediately ignited—the last condition being shown in the accompanying cuts (Figs. 30 and 31)—and the flame from the capillary tube is extinguished.—*Pharm. Ztg.*, 48, No. 90 (Nov. 11, 1903), 913.

New Gas Burner—Advantage in Various Analytical Operations.—L. Quennessen describes the new gas burner shown by Fig. 32, which serves

FIG. 32.



New Gas-Burner.

a useful purpose in conducting various analytical operations, 1 reverting by suitable adjustment of the glass matras the bumping of the contents, or facilitating the heating of the liquid contents at various heights. The gas comes out through holes arranged round the interior of a crown, so that the heating is annular and the boiling is effected, no longer at the bottom, but round the side of the matras. Thus projections are prevented. To effect the application of heat to the matras at various heights, the bottom of the matras is held by a copper support in the form of a tulip; this latter is brazed to the upper part of a screw that can be turned up or down the axis of the heating crown; the end of this screw fits into a tube to prevent all loss of gas. This burner can be used with advantage also in the estimation of nitrogen by Kjeldahl's method, a process which, in fact, is much easier to carry

out in assay matrasses on account of their long necks—these being much longer than are the necks of flasks of the same capacity generally used in chemical work.—*Chem. News*, Aug. 7. 1903, 66.

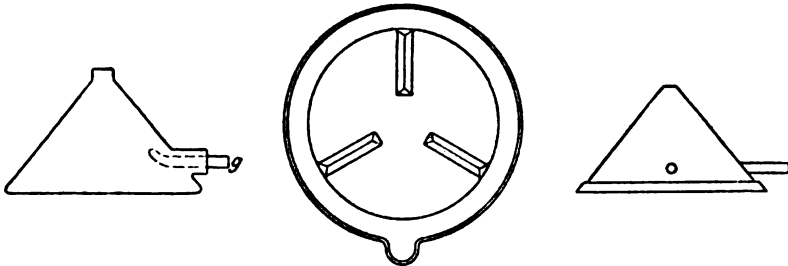
Funnel Gas Burner—A Novel Device.—P. Soltsien has devised a novel burner which, in conformity with its shape (see Fig. 33), he has named "funnel-burner." It is easily constructed of either metal, porcelain, clay, soapstone or other non-combustible material, and may be described as a funnel without a neck, provided at *g* with an opening for the admission of

gas, through a small glass tube, slightly curved upwards at the inner extremity, but not reaching far towards the center, which is held in place by a cork. Air may be admitted from beneath if the burner is constructed of porcelain, by setting it upon a plate provided with grooves, as shown by Fig. 34, or by providing several nicks or curves in the lower rim of the burner. If it is to be constructed of metal—for example, of sheet-iron—it may have the simpler form, shown by Fig. 35. In this case, the gas

FIG. 33.

FIG. 34.

FIG. 35.

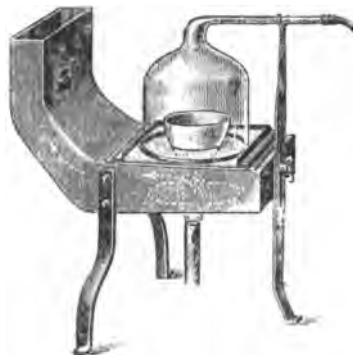


Funnel Gas Burner.

may be admitted through a metal tube, and the air through lateral openings near the bottom of the burner. This construction insures cleanliness, prevents the stoppage of the flow of gas by accumulation of dust and particles falling into the gas delivery tube, and is, moreover, economical.—*Pharm. Ztg.*, 48, No. 56 (July 15, 1903), 561.

Combustion Oven—Protection from Flame-Gases.—The combustion gases from a Bunsen burner contain, as is well known, both sulphuric and nitric acid, and these are the frequent sources of error in ash determinations when the incineration is effected with the open flame. In order to avoid such errors, H. Wislicenus has devised the combustion oven shown by Fig. 36, which is simple in construction and requires little explanation. The crucible is heated in the sand-bath by means of the Bunsen flame, the gases from which are carried into a convenient flue. The hood of thin glass is used only when the incinerations are to be effected in an atmosphere of neutral gas or in a current of oxygen, which is admitted by means of the glass tube extending from the apex of the hood, the latter being pressed into the sand just sufficient to

FIG. 36.

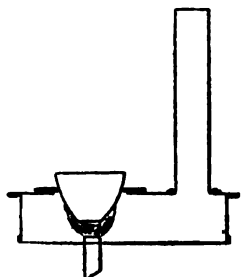


Combustion Oven.

prevent the escape of the gas used in the experiment.—*Pharm. Ztg.*, 48, No. 104 (Dec. 30, 1903), 1048.

A similar combustion oven, which admits of the direct contact of the Bunsen flame with the crucible, shown in outline by Fig. 37, is proposed by O. Pfeiffer. It consists of a sheet-iron disc, resting on a rim of suitable depth to completely cover the Bunsen flame and the inserted crucible—the latter resting in a circular hole provided for the purpose—while a second hole in the disc is provided with a chimney to carry off the flame-gases from beneath. In order to make a close joint, the opening for the reception of the crucible is lined with a ring of asbestos.—*Ibid.*, 49, No. 13 (Feb. 13, 1904), 136.

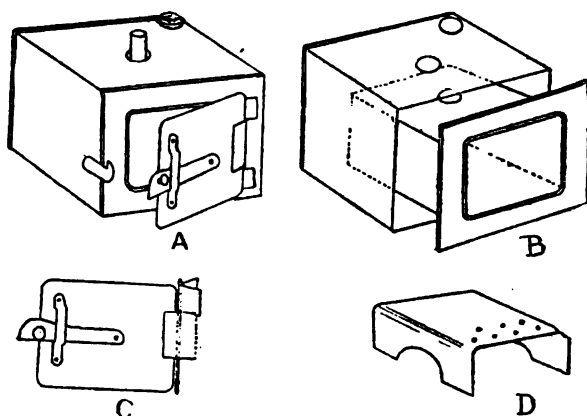
FIG. 37.



Combustion Oven.

Water-Drying Oven—Convenient and Simple Construction.—Arthur W. Nunn describes a water-oven intended for small operations and for students, with explicit instructions which enable its construction by the pharmacist or student. The several parts are shown in detail by Fig. 38, *A*, *B*, *C* and *D*, *A* being the outer jacket, $5\frac{1}{2} \times 5\frac{1}{2} \times 4\frac{1}{4}$ inches; *B* showing the inner dimensions; *C*, the shape and hinges of the door, and *D*, a sliding shelf, removable at

FIG. 38.



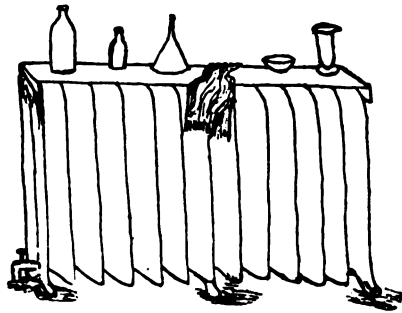
Water-Drying Oven.

will. While not new in design, the very practical instruction given regarding its construction from either tin or copper will doubtless prove serviceable, but must be consulted in the original.—*Pharm. Jour.*, Nov. 28, 1903, 780.

Convenient Drying Shelf—Utilization of the Steam Radiator.—Wm.

Mittelbach describes the drying shelf shown by Fig. 39, which at once appeals to convenience and utility where hot water or steam is used for

FIG. 39.

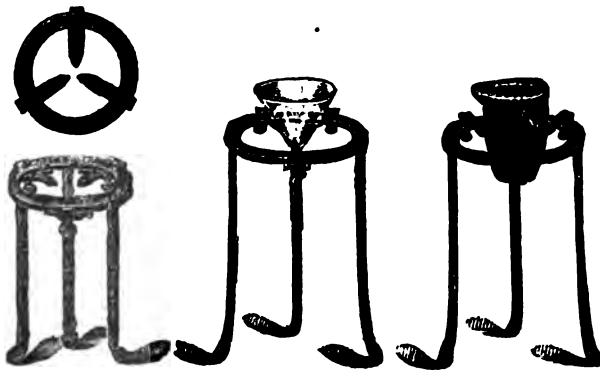


Convenient Drying Shelf.

heating purposes. A piece of sheet iron as wide and four inches longer than the radiator is placed on top of the same, the ends being bent down so as to hold it firmly in position. This makes a handy and practical place for drying bottles, mortars, funnels, and other utensils, during the winter months when the radiator is in use—while numerous other uses will readily suggest themselves.—Meyer Bros. Drugg., June, 1904, 174.

Universal Tripod—A Useful Device.—F. Albin has constructed the tripod illustrated in Fig. 40, which admits of different uses by

FIG. 40.



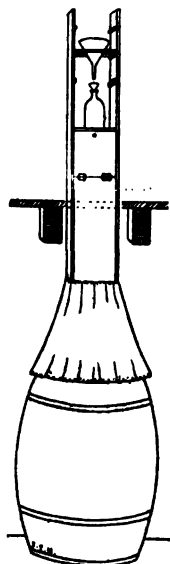
Universal Tripods.

the aid of the movable tongues provided on the flat ring composing the support in the tripod of customary construction—these tongues being held in place by means of set screws in the three equi-distant slits provided for their reception. By the use of this device vessels of different shape and size may be heated direct without the interposition of wire

netting, and are securely held in place.—Pharm. Ztg., 48, No. 62 (Aug. 5, 1903), 627; from Chem. Ztg., 1903, No. 52.

Prescription Department—Elimination of Waste-Box.—Joseph F. Hos-

FIG. 41.



Waste-Receiver.

telley describes the cleanly and convenient method for the disposition of rubbish in the prescription department, illustrated by Fig. 41. A box chute is constructed of boards, about 12 inches square, to extend from the prescription department, from a few feet above the floor, into the cellar, as shown. In the face of the chute, near the top, there is a small drop-door with spring hinges to hold it closed, through which waste material is cast into a receptacle (a movable barrel) beneath in the cellar. To prevent dust spreading in the cellar when sweepings are cast into the chute, a hood of cloth or canvas, fastened to the lower end of the chute, is hung over the barrel collecting the rubbish—a circular base being given to this hood by tacking the material to a barrel hoop somewhat larger than the top of the waste-receiver. To utilize the space above the waste-shaft, the two boards forming the sides of the chute may be extended upward some distance beyond the top and converted into a filter support, as shown in the drawing.—Merck's Rep., Jan., 1904, 8.

Prescriptions—System of Receiving, Filling and Delivery.—The "Bulletin of Pharmacy" (July, 1903, 301) calls attention to the following system of receiving and filling prescriptions used in one of New York's most prominent pharmacies, which may commend itself for adoption, in a more or less modified form, in pharmacies not so liberally supplied with assistants: A receiving clerk takes the prescription and the customer's name, giving him a numbered check. The receiving clerk gives the prescription to the label man, who writes the directions, pins them to the prescription and passes them to the head clerk. The latter prices and assigns the work to a filler. The filler has no writing to do. He returns the medicine to the head clerk, who checks the contents and places the bottle in a cabinet behind the delivery clerk. The latter requires the customer's number and name as a double check when he gives out the medicine. Both name and number are recorded with the prescription and date.

Delivery Check—A Practical Idea.—Having occasion to send out many packages to his customers, Frank P. Pyatt devised the delivery check here shown, which explains itself:

<i>For M O. C. Buss</i>	<i>For M O. C. Buss</i>
<i>Address</i>	<i>Address</i>
<i>Paid</i>	<i>Paid Charge Collect</i>
<i>Charge</i>	
<i>Collect</i>	
<i>Del'd by</i>	
<i>No 354</i>	<i>No 354 Del'd by</i>

FROM

FRANK P. PYATT

Pharmacist

Cor. 63d Street and Monroe Avenue. Chicago

This plan has several advantages which will be immediately manifest: (1) All the information needed by the messenger is contained on the pasted slip. (2) The presence of the slip on the package, containing the druggist's name, is of itself an advertisement, and the manifest care which the druggist takes cannot but impress the customer favorably. (3) The retention of the stub serves as a check upon the messenger, (4) is useful in case there should be any doubt about any particular package, is also (5) a record of the delivery business transacted, and, finally, furnishes names and addresses for the druggist's mailing list.—Bull. Pharm., March, 1904, 113.

Prescriptions—A Filing Idea.—Andrew R. Cunningham has put into

FIG. 42.



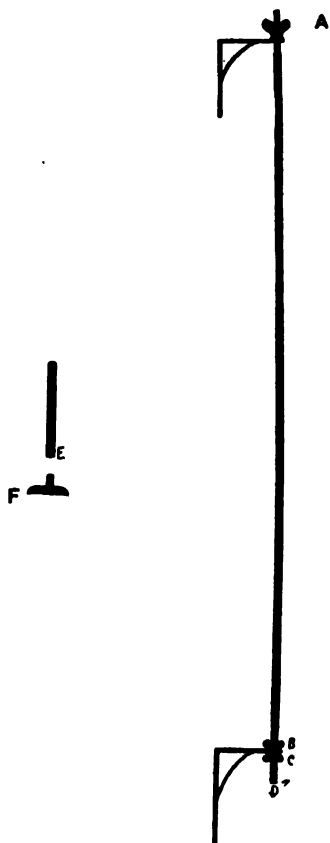
A Filing Idea.

practical use the idea represented in the accompanying illustration (Fig. 42). He pastes the prescription on cards of light manilla card-board of uniform size (5x8 inches), especially made for him by a local printer, on

which blank spaces are provided for the number of the prescription, the date of its preparation, the price, the initial of the dispenser, the initial of the checker, and the name and address of the customer; and in addition to this, a special notation or record is made each time the prescription is refilled, while the extra space admits of making notes of any special information that may be necessary, such as particular expedients necessary for the preparation of the prescription. These cards may then be filed in drawers of suitable size and capacity for 1000 prescriptions.—*Bull. Pharm.*, March, 1904, 114.

Prescription File—A Practical Device.—J. W. P. Outerbridge has de-

FIG. 43.



Prescription File.

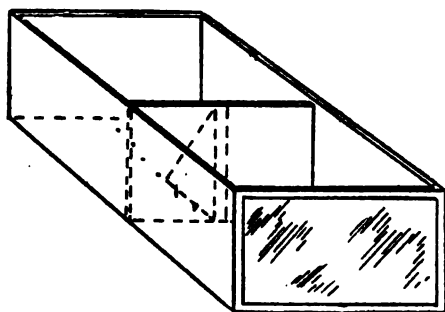
vised a convenient method of prescription filing which is illustrated by the accompanying cut, Fig. 43. The method requires the use of a desk-file, shown by *e* and *f*, and a stationary file, indicated by *a*, *b*, *c* and *d*, both constructed of No. 8 brass wire. In the stationary file, the wire or rod is held in a rigid, perpendicular position between two iron brackets (or shelves) by the aid of three nuts, *a*, *b* and *c*, a hole, *d*, being bored in the lower end of the rod, and necessarily a thread provided at both ends for the accommodation of the nuts. The desk-file consists of a short piece of wire with an inner thread *e*, screwed onto the base *f*, this inner thread accommodating that of the wire at *a*. The day's prescriptions are placed on the desk-file, which should not be pointed, after first punching a hole into them of sufficient size to facilitate their removal. They are transferred to the stationary file, as follows: Unscrew the nut *a*, curve the wire slightly, so as to bring the upper end out of the bracket, unscrew the desk-file from its base and screw on to the stationary file, allowing the prescriptions to slide down, and then readjusting the two files. The transfer of the year's accumulation of

prescriptions to a "permanent file" is effected by unscrewing the nuts *a* and *c*, slipping the file from the brackets, unscrewing the nut *b*, inserting

a pointed wire of sufficient length into the hole *d*, and slipping the prescriptions on to it. These permanent files may for two or three years back be kept conveniently near and also in a rigid perpendicular position.—*Amer. Journ. Pharm.*, 76, No. 5 (May, 1904), 221-223.

Formula Cards—A Practical Convenience.—Joseph F. Hostelley observes that formulas may be kept conveniently and systematically as follows: The formulas are written on pieces of card-board, one formula on each piece, and arranged in a narrow drawer (Fig. 44), a little wider than

FIG. 44.



Case for Formula Cards.

the formula cards, the face of the drawer being of glass. The cards are packed closely, all facing the front of the drawer. The formula pressed against the glass may be followed readily with the drawer closed. The position of the drawer selected for this purpose is just over the work bench. In default of this a drawer made from a small box of suitable dimensions is swung under a convenient shelf. To keep the formula cards upright and packed closely that the one to be read through the glass face of the drawer presses against the glass, the following idea is put in practice: A movable partition fits loosely across the drawer and is held up against the pack of formula cards by means of a triangular block of wood with two pins in the lower edge that fit into holes in the bottom of the drawer; a number of holes are bored in the bottom, in a straight line down the center, equidistantly, at such a distance asunder that the pins in the support may fit into any two of them. In this way the number of formula cards may be increased and properly supported; as the number grows greater the pins in the block occupy holes further back. The block may be readily removed when a certain formula is to be located and just as easily replaced.—*Drugg. Circ.*, 48, No. 1 (Jan., 1904) 6.

Medicine Containers—Possible Evils Resulting from the Practice of Refilling Them.—Theodore Campbell observes that it has been the custom for many years both with physicians and families to return empty bottles, boxes and ointment jars to the drug stores to be refilled, or pint

and quart bottles for credit, or to send atomizers, syringes, ice-caps, water bottles and other articles to be repaired—all of which is right and proper so long as these various objects are not sent from a sick-room or locality in which a contagious disease exists. Bringing these articles from such rooms there is always danger of spreading the disease, not only in the family of the druggist, but in other families, and there is little doubt that in practice the germs of many infectious diseases are in this way carried into other homes from the drug stores. It should be insisted that the physician in attendance on such cases caution the family and nurses not to send such or any other article from the sick-room to the drug store for any purpose whatsoever, while the druggist in self-defence should decline to receive or handle such articles when he knows them to come from the sick-room of a patient suffering with a contagious or infectious disease.—*Proc. Pa. Pharm. Assoc.*, 1803, 137, 138.

Amber Glass—Advantages as a Protective Agent to the Influence of Light.—F. A. Upsher Smith contributes detailed notes on the effect of light on various medicinal compounds, which may be protected from its untoward influence by storing and dispensing them in containers of amber glass, which has precisely the same effect as placing the containers in darkness. Beginning with acidum carbolicum, the author enumerates and describes the effect of sunlight upon a large number of medicinal compounds, ending with tincture ferri chloridi; and, in conclusion, he submitted the following maxims:

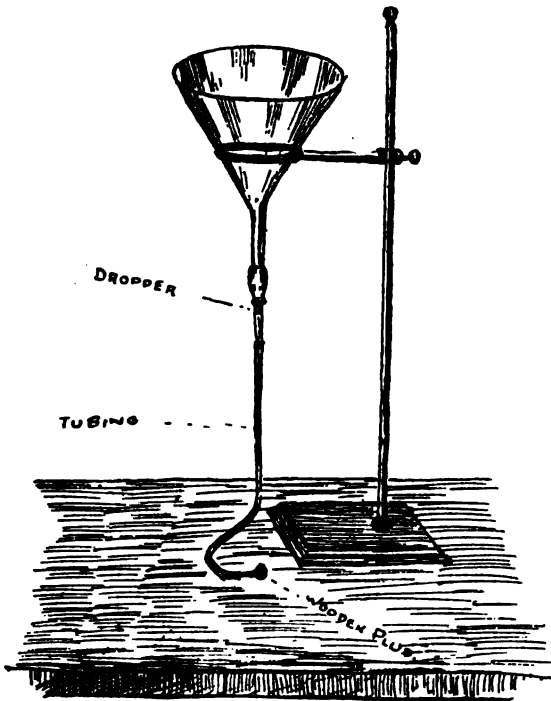
1. When in doubt use amber glass.
2. In fitting out a pharmacy let all shop-rounds be of amber glass, and as small as convenient.
3. It is highly probable that incandescent, acetylene, and electric lights are similar to solar lights in promoting chemical change. Hence the importance of protecting substances that are exposed to their action.
4. Amber glass is preferable to green glass from the fact that it contains no lead.—*Chem. & Drugg.*, April 20 and 30, 1904, 647 and 693.

Bottle Filler—Simple Construction.—R. H. Thomas, instead of resorting to the more or less expensive apparatus supplied for filling bottles, resorted to the simple and ingenious contrivance shown by Fig. 45. Taking a glass funnel, an ordinary eye dropper and a piece of rubber tubing such as used on a nursing bottle, after breaking the small glass point off the dropper, he attached the rubber over the glass tube, then cut the tip off the bulb of the pipette and fastened it over the neck of the funnel. A small wooden plug inserted in the end of the rubber tube completed the apparatus. Then, placing the funnel in a filter rack and filling it with the liquid to be transferred to the bottles, the tubing is grasped near the end between the thumb and forefinger of one hand, the plug removed with the other, the tube then inserted in the bottle and the pressure released. When the bottle is full, the pressure is again applied either by means of

the thumb and forefinger or with a wire pinch-cock, and the operation repeated until all the bottles are filled. This is a cleanly method of filling bottles by which loss is avoided. The apparatus, of course, is not adapted for heavy liquids like castor oil or glycerin.—*Amer. Drugg.*, 43, No. 10 (Nov. 23, 1903), 296.

Corking Machine—A Useful and Economical Device.—Joseph F. Hosteley describes a device for forcibly corking bottles (see Fig. 46), which he has employed with great success. It puts the cork in quickly, firmly,

FIG. 45.

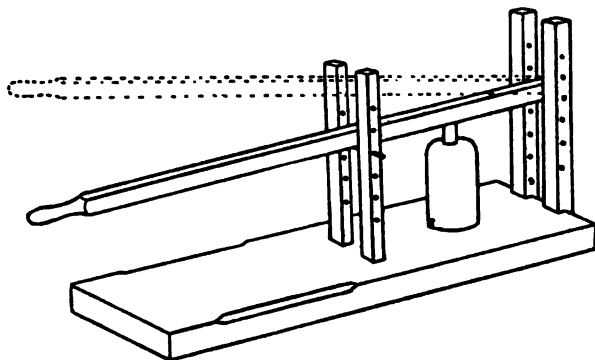


Bottle Filler.

and without danger to the bottle or the operator's hands, and can be made entirely by the druggist himself with little expense according to the following directions: For the base select a section of $1\frac{1}{4}$ inch yellow pine or oak, about 16 inches long and 4 inches wide. The four upright pieces and the lever should also be of hard wood—oak possibly. The former might be about 14 inches in height, the lever 20 inches long. The pair of uprights at the extreme end of the device are fastened to the base by lap-over joints to give solidity; the two near the center are mortised to the base, square tenon on the end of each upright fitting into the mortise in

the base. The holes in the uprights, bored previous to their adjustment, are of $\frac{3}{8}$ -inch bore. The holes in the uprights at the end are all provided with sleeves cut from brass tubing with a hack-saw and forced into the holes. An iron pin that will fit the sleeved-holes snugly acts as a hinge on which the lever swings. The hole in the end of the lever through which the pin passes is also sleeved with brass tubing just as the holes are in the uprights at the end. The hole in the uprights near the center need not be sleeved. The lever merely rests at this point on the pin that passes through the two upright pieces when it is pressed down to force a cork into the neck of a bottle, the latter standing midway between the two sets of uprights as is shown by the illustration. To predetermine to a nicety the location of the holes to be bored in the uprights, the pieces are set in the positions they are to occupy without nailing, a bottle is rested on the base of the device midway between the two pairs of uprights, the lever is

FIG. 46.



Corking Machine.

held horizontally across the lip of the bottle in its proper position between the uprights, as it is intended to swing, and the situations for the boring of the holes marked with a pencil. This question will solve itself easily as the designer progresses in the work. The device being completed, the designer knows from just what height the lever must swing to cork bottles of a certain capacity, so, when about to begin work, he sets the lever to swing properly by adjusting the pin at the hinged end, making a similar adjustment where the lever comes to rest on the pin between the two uprights near the center of the device. He has bored as many holes in the uprights for different adjustments as he has bottles of different capacities which he wishes to operate with.—Bull. Pharm., June, 1904, 241.

"Korkit"—An Improvement in Corks.—In a lecture delivered by H. Helbing, at a recent meeting of the German Cork Industry, he demonstrated an improvement in corks which he, in association with Dr. F. W.

Passmore and Mr. Fortescue Wetherman has carried out and perfected on the industrial scale. The purpose of the invention is, to put it very briefly, to rebuild the cell-walls of the cork layers, so as to restore the elasticity at one stage or other exhibited by the structure. As Mr. Helbing put it in his lecture, elasticity, resistance, freedom from odor, insolubility (and consequent freedom from taste), porosity (without allowing liquids and gases to permeate) are the principal properties which give cork its utility; they are the essential features of cork, and according to whether the product possesses these qualities to a greater or less extent the utility and applications of the cork are determined, while the defects of cork are traceable to the lack or irregular distribution of these properties. The process which Mr. Helbing and his colleagues have devised neither removes any part of the cork, nor does it modify any good property of the cork. It is quite simple in principle, and consists in first permeating the cork with casein, and then fixing it and rendering it insoluble by means of formaldehyde. The casein takes the place of degenerated cellulose—in fact, wherever the solution is absorbed an exceedingly thin but very resistant and elastic skin is formed which covers the cell-walls, cork-dust and soluble substances, and this action increases with the size of the cells and with the porosity of the cork. The cork itself regulates the quantity of casein necessary for its improvement, and by its selective action controls the building-up of weak parts, this resulting in cork of uniform resisting power. It is the whole cork, and not merely the surface, that is improved. This is demonstrated when a treated cork is submitted to pressure in a Salleron apparatus, and it is found that a treated cork, although previously brittle or spongy, has all the spring which is needed in one of the best champagne-corks. The process of treatment is termed "korkit." Apart from the improvement in elasticity, the most notable feature about "korkit" corks is their comparative resistance to acids and alkaloids.—Chem. and Drugg., Jan. 30, 1904, 189.

Bottle Sealing—Use of Paraffin.—W. A. Dawson calls attention to the use of paraffin as a sealing material for bottles containing such pharmaceutical preparations and specialties as are commonly put up for sale in drug stores. The paraffin used for sealing or capping may be suitably colored by mixing with it various dry pigments in fine powder, or it may be stained with aniline or other transparent dyes—the colorings possible to use being almost limitless. With the use of dry colors, opaque sealing compounds are obtained that resemble the better grades of sealing-wax in appearance, while at the same time they make a better, air-tight, non-brittle seal.—Bull. Pharm., Dec., 1903, 509.

Bottle-Capping Wax—Formula and Use.—Julian L. Waller recommends the following formula for a fine bottle-capping wax :

Rosin.....	1 oz.
Hard yellow wax	2¼—2½ oz.

Color with lampblack or vermilion, or both, and you will have a neat dull-finish cap. See that the corks are of the best and are cut smooth on the top with a sharp knife in order to have the wax set evenly. Apply five minutes after removing from the fire, and hold the bottle while dipping at an angle of about 45 degrees, revolve the bottle in the mixture and stand quickly upright.—Merck's Rep., Aug., 1903, 217.

Shop-Bottle Labels—Method of Applying an Impervious Varnish.—Hans Terrey describes the following method which will render paper labels on shop-bottles impervious to the action of water, alcohol, ether, or oils, etc. The labels having been pasted on a thoroughly clean surface, are allowed to thoroughly dry, then given a coat of collodion to protect the water-soluble lettering. A coat of warm gelatin solution (5:25) is then applied, and when this has set, and while still moist, 40 per cent. formaldehyde solution is applied to the coating by means of cotton moistened with it. When dry, a perfectly transparent and shining varnish-like coating is thus produced, which effectually resists the action of the liquids above mentioned. Several coats may be applied if deemed desirable.—Pharm. Ztg., 49, No. 14 (Feb. 17, 1904), 150.

Label Paste—A Good Formula for General Use.—The "National Druggist" gives the following formula for a label paste which, it is said, will stick paper or cloth to metals: Starch, 20 parts; sugar, 10 parts; zinc chloride, 1 part; water, 200 parts. Mix the ingredients to a smooth paste and heat cautiously until it thickens, stir down and remove from the fire.—Nat. Drugg., Nov., 1903, 322.

Paste-Pot—Hints Regarding its Shape, Disposition and Use.—W. A. Dawson finds that the best of all receptacles for label paste is the old-fashioned, turned-in-edge soda-water glass—the old original soda tumbler of Matthews' invention. The paste should be made with the finest wheaten flour, with ten per cent. of white dextrin added and well cooked, and the brush should be a one-inch, flat, bristle varnish brush, "water-proof fastened." A place for the paste-pot in use is made by boring a hole with an extension bit in a shelf wherever convenient; the hole being of a diameter that will admit the lower half of the tumbler. Covers slightly larger in diameter than the tops of the tumblers, are cut from very heavy cardboard boxes, the center scored star-shaped, and the handle of the brush being pushed through it, the points of the star holding the brush-handle at any desired height. The superiority of such home-made pots over any patent paste-pot is their cleanliness. A small amount of paste, only enough to last a day or two, is placed in the glass, and when this is used up or the pot becomes soiled, it is replaced with fresh paste in a clean glass, with a clean, dry brush and a new card cover. And the

dirty glass and brush are put to soak, afterward cleaned and dried and placed with the reserve stock of tumblers and brushes, those in reserve being equal in number to those in use.—Bull. Pharm., Dec., 1903, 519; from Proc. N. Y. State Pharm. Assoc., 1903.

Scio-Liao—A Chinese Cement for Porcelain.—Under the name of Scio-liao the Chinese prepare a cement which reunites broken porcelain, faïence, stoneware, etc., almost as firmly as it was before being broken. This is said to be made as follows :

Lime, slaked and powdered.....	54 parts.
Alum, powdered.....	6 parts.
Blood, ox, fresh, well-beaten	40 parts.

Mix and stir until a homogeneous creamy mass is obtained, more or less dense, according to the uses to which it is to be applied. In its more fluid condition this mass may be used to stiffen and render impermeable objects of paper or cardboard. Two or three coats applied to thin cardboard make the latter as resistant to pressure or moisture, etc., as the hardest wood. The material is a brownish-red in color, with a polished, glistening surface, and is attacked by neither grease, water nor any of the ordinary solvents.—Nat. Drugg., January, 1904, 12.

Mortar-Grip—A Convenient Device.—William Lister observes that for a considerable time past there have been numerous inquiries from pharm-

Fig. 47.



Mortar-Grip.

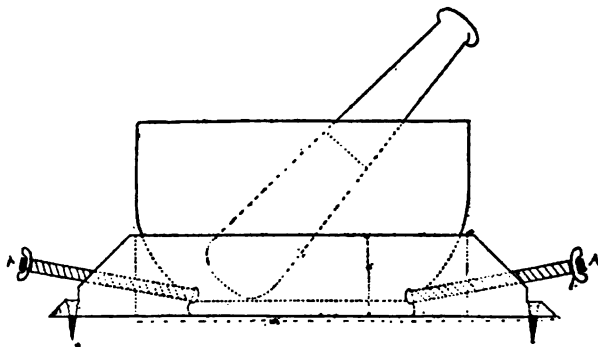
acists and others for some one to come forward with an efficient apparatus which would firmly secure a mortar while in use for making various pharmaceutical products on a small scale. Such a device has now been perfected and is shown in outline and detail by the accompanying cuts, viz. : Fig. 47, a mortar in the grip : Fig. 48, the same in detail ; Fig. 49, one of the screws ;

Fig. 50, a horizontal (top) view of the base. These several parts explain themselves. The screws *A*, $5\frac{1}{2}$ inches long, are fitted at the grip end with a loose joint or swivel, so that when the screw is tightened, according to the size of the mortar in use, the swivel remains stationary. The extremities of this swivel are secured with India rubber, which insures a firmer hold than the base metal. The base is $15\frac{3}{8}$ inches in diameter at the bottom, and is held in place by the screws *B*, as shown in Fig. 49. The base may be made in either wood or metal, but metal is preferable, wood having a tendency to split. When made in the dimensions indicated it will accommodate mortars varying in size from No. 5 to No. 9.—Chem. and Drugg., Jan. 30, 1904, 180.

Glass Tubing—A Convenient Rack.—Joseph F. Hostelley describes

the rack for the convenient disposition of glass tubing when not in use, shown by Fig. 51. For this purpose, the inner side of a closet door is utilized with advantage, and it offers a system of storage that insures the

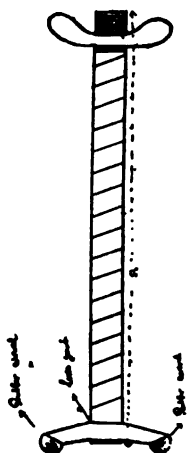
FIG. 48.



Mortar-Grip.

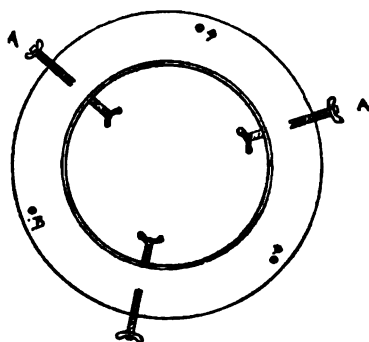
safety of long glass tubing. The tubes are held in position at the bottom by slender wire nails, with bung heads, bent upright at right angles with $\frac{1}{8}$ -inch of the point where they enter the door, forming a hook over

FIG. 49.



Screw.

FIG. 50.



The Base.

which the end of the tube is passed. At the top the tubes are secured in this way: Across the upper portion of the door a strip of wood is nailed, at such a distance from the lower hook supports that the longest glass tubing may stand between. At regular intervals small holes are

drilled in this strip through which long straight pieces of wire are passed, bent into little circles at the top to hold them in the position shown in the sketch; the rings prevent the wires from slipping through the holes, and offer finger hold when they are to be raised. This is done when a tube is to be stood in position on the rack, the wire slipping into the tube for several inches of its length. The wires should be long enough to catch tubes five or six inches shorter than the longest ones. —Drugg. Circ., 48, No. 1 (Jan., 1904), 6.

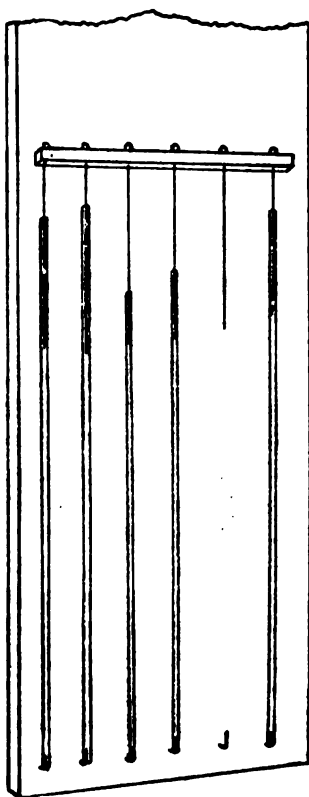
Glass Tubes — A "Wrinkle" in Glass Blowing.—Instead of using cork or rubber stoppers, or the cotton-wool plugs often improvised for the ends of glass tubes requiring to be *blown*, Dr. F. S. Locke has for several years employed with advantage plugs formed as required of loose asbestos, of the kind known as "woolly." The proper amount is rolled into a ball and stuffed into the opening to be stopped with the aid of, for example, a wooden match. A much better seal is obtained than with cotton-wool, and a further advantage is the avoidance of charring, etc., when the glass is heated close to the plug.—Chem. News, Dec. 24, 1903, 309.

Brass Tubes—Method of Bending.—Joseph F. Hostelley observes that brass tubes may be bent without kinking by first completely filling the tube with melted rosin.

One end of the tube is plugged, the tube supported in an upright position and the melted rosin carefully poured in at the open end from a lipped vessel. To keep the rosin from solidifying as it comes in contact with the cold walls of the tube, the flame from a Bunsen burner is made to play up and down the tube. The tube must be completely and evenly filled to effect perfect results. It may then be bent into any shape desired.—Drugg. Circ., 48, No. 1 (Jan., 1904), 6.

Soft Rubber Articles—Preservation.—A writer in "Südd. Apoth. Ztg." recommends a $\frac{1}{10}$ per cent. aqueous or alcoholic solution of creolin for the preservation of elastic rubber goods, such as stoppers, tubes, etc. The well-washed article is immersed immediately after use, and will thus retain its elastic condition unimpaired for a long time. It is necessary, of course, to thoroughly wash the article in pure water before use, so that the odor and

FIG. 51.



Rack for Glass Tubing.

substance of creolin may be completely removed.—D. A. Apoth. Ztg., May, 1904, 32.

India-Rubber Articles—Method of Mending.—The "Deutsche Chemische Wochenschrift" recommends the following method for mending rubber articles, such as hose, tires, balls, shoes, etc.: The articles are first freed of adhering foreign particles, and thoroughly dried. Varnish, as, for instance, on rubber shoes, is removed by means of emery paper or a file, and the part thus treated is well rubbed over with benzin. The edges of the hole are then painted over with a solution of Para caoutchouc in benzin, a fitting strip of natural rubber being laid over it, and a solution consisting of 4 parts of benzin, 3 of carbon sulphide, and 0.18 part of sulphur chloride is applied to the edges by means of some cotton wool tied to a wooden holder, this solution serving to vulcanize and to increase the resistance of the rubber. The joined parts have, of course to be well pressed together.—Nat. Drugg., Feb., 1904, 67.

Vulcanized Rubber—Method of Devulcanizing.—The following is an outline of a process of devulcanizing vulcanized rubber, which has recently been patented (in England) by Chantard and Kessler: The caoutchouc, cut into shreds, is first heated in vacuo to 100° C. (212° F.) along with five times its own weight of commercial (crude) phenic acid. By this boiling, the sulphur is partially transformed into volatile products, and thus eliminated partially along with the products of distillation of phenol, and partially by precipitation by lead acetate. The caoutchouc is then precipitated by the addition of some solvent of phenol, such, for instance, as alcohol, sodium hydrate, etc., and is now in a condition for immediate revulcanization.—Nat. Drugg., Jan., 1904, 12.

Incandescent Light Globes—Method of Coloring.—A. Wangeimann calls attention to a possible source of revenue to city druggists, which consists in coloring incandescent light globes. This is easily done by dipping the balls into a thin solution of collodion previously colored to suit with anilines soluble in collodion. Dip and rotate quickly, bulb down, till dry. For office desks, room lights, and in churches it appears often desirable to modify the glaring yellowish rays of the incandescent light. A slight collodion film of a delicate bluish, greenish, or pink shade will do that. Another use of colored collodion is to color the

Show Globes, customarily used in drug stores, on their inside, thus avoiding freezing and the additional weight of the now used colored liquids. Pour a quantity of colored collodion into the clean, dry globe, close the mouth and quickly let the collodion cover all parts of the inside. Remove the balance of the collodion at once, and keep it to color electric bulbs.—West. Drugg., Jan., 1904, 11.

B. PREPARATIONS.

GENERAL SUBJECTS.

Pharmaceutical Preparations—Use of Acacia to Prevent Precipitation by Incompatibles.—Astruc and Robert find that the presence of gum acacia in a pharmaceutical preparation serves, in some cases, to prevent precipitation when it is mixed with another substance otherwise incompatible. For instance, the syrup of iodide of iron of the Codex, which contains syrup of gum acacia, mixes bright with cinchona wine; but, if simple syrup be substituted for the gum syrup, the mixture precipitates. Extract of cinchona (Codex) generally gives cloudy solutions, but if a little mucilage of acacia be added to the extract it gives clear solutions, even with such incompatibles as vegetable infusions, bases, chlorides, iodides, bromides, glycono-phosphates, and arsenical compounds. The deposit which occurs in cinchona wine may be obviated by the addition of 1 Gm. or 2 Gm. of gum acacia to the liter. Wines of other drugs, such as rhubarb and kola, may be kept bright by the addition of 0.5 to 1 per cent. of gum. The ferruginous cinchona wine of the Codex may be similarly preserved by the addition of 1 per cent. of gum. Many other instances of incompatibility may be obviated by the same means.—Pharm. Journ., June 25, 1904, 852; from Répertoire, 60, 199.

Fat-Free Galenicals—Methods of Production.—Professor Wilbur L. Scoville discusses the subject of fat-free galenicals. He says that one of the most striking evidences of the complex nature of galenical preparations is shown in the behavior of fixed oils, fats and waxes occurring in vegetable drugs, when the latter are treated with an alcoholic or hydro-alcoholic menstruum. These fixed oils or fats in themselves are practically insoluble in strong alcohol, and wholly insoluble in diluted alcohol, while waxes are but slightly soluble in the presence of a small proportion of water, yet when the drug is percolated with even so weak a menstruum as diluted alcohol, some of these oils and fats pass into solution with the other constituents of the drug and remain in the percolate. This can be accounted for only by the explanation that the percolate represents a complex solution, and that certain constituents of the drugs which are themselves soluble in the menstruum, in turn dissolve the fats and oils, and the mixture is then extracted by the menstruum. For instance, a drug may contain both an oil and a resin. The resin is soluble in alcohol and also in oil, and when the drug is treated with alcohol the oil and resin are not wholly separated, but a portion of the oil passes into the solution with the resin.

There are three general methods to be considered for the removal of fat from galenicals: (1) It may be extracted from the drug direct by some solvent which will not extract the medicinally valuable constituents; or, (2) it may be removed from the percolate by means of a similar solvent;

or, (3) it may be removed from the percolate by purely physical means. These various methods have been the subject of the author's experiments, from which he concludes that the choice of methods depends, not upon efficiency, but upon considerations of activity in the preparations, economy and convenience.

The first method, preliminary treatment of the drug with ether or gasoline, is universally applicable, except in the rare instances in which the active principles of the drug are extracted by these solvents. The objections to it are that it requires more time and labor, and solvent than the others.

The second method, shaking a concentrated extract with a suitable solvent as ether or paraffin, is applicable in all cases where heat has no action upon the active principles. Ether can be used only with aqueous fluids, and it involves concentration of the percolates and heating to drive out the odor of the ether. Paraffin is more economical than ether, and can be used with alcoholic as well of aqueous fluids. Concentration is also unnecessary. But in some instances the heat required for the liquefaction of the paraffin would act injuriously upon the preparation.

The method of freezing out the fat is restricted to alcoholic liquids which will not themselves freeze. It is easy and economical up to the point of filtration; then it requires attention to preserve the advantage gained. This method is not, however, a difficult one, and it produces excellent results.—*Drugg. Circ.*, 48, No. 5 (May, 1904), 93.

AQUÆ.

Aromatic Waters—Criticism.—Paul Caldwell finds that aromatic waters, made with magnesium carbonate, are superior in strength and make clearer solutions than when made with precipitated calcium phosphate according to the U. S. P. He makes

Camphor Water by using, instead of camphor, a corresponding amount of spirit of camphor, without magnesium carbonate, and filters the mixture through a plain filter, returning the filtrate once or twice until it passes clear.

Cinnamon Water, if made from oil of Ceylon cinnamon, instead of cassia oil, does not become flaky or cloudy.—*So. Drug. Journ.*, Dec., 1903, 186.

CAPSULÆ.

Gelatin Capsules—Basis and Process of Preparation Suggested for the New Codex.—The following basis is stated in "*Journ. Pharm. d'Anvers*" (59, 223) to be that which will be official in the new Codex for the preparation of gelatin capsules: Gelatin, 1 part is macerated in water for 12 hours and then drained; glycerin, 2 parts, mixed with water, 1 part is then added to the softened gelatin, and the mixture treated on a water-bath and evaporated to a suitable consistence. Into this melted mass the

molds, made of polished steel terminated by an oval bulb and lubricated with a little liquid vaseline are dipped, withdrawn, and rotated so as to distribute the melted gelatin evenly over the surface. When the gelatin has set, the molds are allowed to stand in a cool place, and after a time the gelatin coating is removed from the molds, and, the pedicels being cut off, the capsule is ready for filling according to general directions, which are also given.—Pharm. Journ., March 5, 1904, 325.

Sandal-Oil Capsules—Variability in Quality of Content.—Dr. Robert Peter has examined the sandal-oil content of a number of sandal oil capsules supplied by different manufacturers. Basing his opinion on the valuation of santalol in the oil content, which is conveniently carried out by the method given by Gildemeister and Hoffmann, he has found three of the seven samples examined to contain inferior or adulterated oil. The percentages of santalol found were 57.4, 92, 71.4, 77.3, 90.1, 90.4 and 92 per cent. The first of these evidently contained a grossly adulterated oil, had a low sp. gr. (0.963), and was insoluble in 5 parts of 70 per cent. alcohol. All the other samples were soluble, and with the exception of the last (which had the sp. gr. 0.978), had the sp. gr. 0.975. In view of the irritant effect upon the kidneys sometimes observed by the use of inferior sandal oils, it seems important that commercial sandal-oil capsules should be subjected to examination before placing reliance on them as suitable representatives of the oil.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 573.

ELIXIRA.

Aromatic Elixir—Improved Formula.—Professor Wilbur L. Scoville, after a thorough study of his subject with the object of improving the formula for aromatic elixir, recommends the substitution of the oils of orange and lemon now employed by tinctures prepared from the fresh peels of the fruit (which see under "Tinctures"), and also the addition of a certain quantity of white wine—preferably muscatel, next tokay, catawba and angelica, while sherry and "champagne" are less satisfactory. The latter two impart a heavy flavor and do not blend perfectly, and the same is true of the red wines, which, moreover, could not be chosen unless a colored elixir is desired. But wine is needed in this elixir to bring out the flavor, a moderate amount developing and brightening the orange flavor without imparting a vinous quality. The following formula will produce an elixir corresponding to the official aromatic elixir in character and strength, but improved in vigor and delicacy :

Tincture of fresh orange peel, 50 per cent.	15.00 Cc.
Tincture of fresh lemon peel, 50 per cent.	3.00 Cc.
Oil of coriander.	0.25 Cc.
White wine	125.00 Cc.
Deodorized alcohol	230.00 Cc.
Syrup	375.00 Cc.
Distilled water, sufficient to make	1000.00 Cc.
Purified talcum	10.00 Gm.

Mix the tincture, oils and alcohol, add the wine, then the syrup, then, gradually, enough distilled water to make 1000 Cc. Diffuse the talcum in this mixture, shake occasionally during four to seven days, and filter, returning the first portions of filtrate until it passes clear.—*Amer. Journ. Pharm.*, 76, No. 4 (April, 1904), 158-162.

Aromatic Elixir—Modification of Formula and Manipulation.—H. A. B. Dunning finds that the clarification of aromatic elixir with precipitated calcium phosphate as directed by the U. S. P., is very tedious, particularly when the quantity to be made is large, but that a slight modification of the formula and in the manipulation—which particularly makes no change in the ingredients—facilitates the process very much. The following is the proposed method:

Compound spirit of orange.....	12 grams.
Sugar	375 grams.
Precipitated calcium phosphate	15 grams.
Alcohol	250 Cc.
Water	560 Cc.

Dissolve the compound spirit of orange in the alcohol in a suitable container. Add the precipitated calcium phosphate and distribute thoroughly by shaking; then add the water, and allow to stand for 24 hours. Filter, place the sugar in a percolator of suitable size and pour the filtrate over it, until the sugar is dissolved, and finally add a mixture of 1 vol. of alcohol and 3 vols. of water, sufficient to make 1000 Cc.—*Drugg. Circ.*, 48, No. 2 (Feb., 1904), 29.

Simple Elixir—Manipulation.—Paul Caldwell finds that simple elixir will filter clear at once if the mixture of ingredients be effected as follows: Mix the syrup and water and the alcohol and oil (= compound spirit of orange, Rep.) separately; add the precipitated calcium phosphate to the latter, and then mix the two liquids and filter.—*So. Drug. Journ.*, Dec., 1903, 186.

Elixirs of the Glycerophosphates—Uniformity in Formulæ and Nomenclature.—With the object referred to under "Glycerophosphates" (which see under "Organic Chemistry"), Melvin W. Balmford suggests the following titles and compositions for a series of elixirs of glycerophosphates suitable for adoption in the U. S. Pharmacopœia or in the National Formulary:

Elixir Glycerophosphatum—Elixir of Glycerophosphates.—1000 Cc. to represent: Calcium glycerophosphate, 45 Gm.; potassium glycerophosphate, 15 Gm.; sodium glycerophosphate, 15 Gm.

Elixir Glycerophosphatum cum Ferro—Elixir of Glycerophosphates with Iron.—1000 Cc. to represent: Calcium glycerophosphate, 25 Gm.; potassium glycerophosphate, 15 Gm.; sodium glycerophosphate, 15 Gm.; iron glycerophosphate, 10 Gm.

Elixir Calcii et Sodii Glycerophosphatum—*Elixir of Calcium and Sodium Glycerophosphates*.—1000 Cc. to represent: Calcium glycerophosphate, 35 Gm.; sodium glycerophosphate, 35 Gm.

Elixir Glycerophosphatum Compositum—*Compound Elixir of Glycerophosphates*.—1000 to represent: Calcium glycerophosphate, 35 Gm.; potassium glycerophosphate, 17.5 Gm.; sodium glycerophosphate, 17.5 Gm.; iron glycerophosphate, 2.25 Gm.; quinine glycerophosphate, 1.125 Gm.; strychnine glycerophosphate, 0.33 Gm.—*Amer. Journ. Pharm.*, 76, No. 6 (June, 1904), 277-279.

Elixir of the Glycerophosphates of Lime and Soda—*Formula*.—The principal difficulty in making an elixir of the glycerophosphates of lime and soda is to keep the calcium salt in solution. Wm. C. Kirchgessner finds the following formula and process to overcome this difficulty:

Sodium glycerophosphate 128, gr.
Calcium glycerophosphate, 64 gr.
Phosphoric acid, 85 per cent 2 fluid drachms.
Simple syrup, 4 fluid ozs.
Fluid orange, 2 fluid drams.
Prune juice, q. s. for one pint.

Dissolve the calcium glycerophosphate in two fluid ounces of prune juice with the phosphoric acid previously added, and dissolve the sodium glycerophosphate in the remaining prune juice previously mixed with the syrup and fluid orange. Mix the two solutions and filter if necessary.—*Proc. Mich. State Pharm. Assoc.*, 1903, 57.

Elixirs—Formulas of the German Hospital.—The following simple formulas for a number of elixirs in use in the German Hospital, Philadelphia, are given in the pharmacopœia of that institution:

ELIXIR OF ACETANILID, COMPOUND.

Acetanilid	10
Caffeine	1
Sodium bromide.....	30
Aromatic elixir, to make	500
Dose, 5.00 to 10.00.	

ELIXIR OF AMMONIUM VALERIANATE.

Ammonium valerianate.....	40
Aqua ammonia.....	3
Essence of vanilla	10
Aromatic elixir, to make.....	1000
Dose, 2.00 to 10.00.	

ELIXIR OF CASCARA SAGRADA.

Cascara sagrada	200
Taraxacum	100
Mandrake	100
Aromatics, alcohol and water to make.....	500

ELIXIR OF CINCHONA (Elixir of Calisaya).

Quinine sulphate	5
Cinchonine sulphate	2
Cinchonidine sulphate	1
Aromatic elixir, to make.....	1000
Caramel to color.	

ELIXIR OF CINCHONA AND IRON (Ferrated Elixir of Calisaya).

Scale iron phosphate	40
Water, hot.....	100
Elixir of cinchona, to make	1000

ELIXIR OF HEROIN, COMPOUND.

Heroin hydrochloride	0.5
Ammonium hypophosphite	20
Tincture of henbane	50
Syrup of tolu.....	200
Glycerin	200
Aromatic elixir, to make	1000

ELIXIR OF IRON, QUININE AND STRYCHNINE.

Scale iron pyrophosphate.....	40
Quinine sulphate.....	10
Strychnine sulphate	0.15
Aromatic elixir, to make.....	1000

ELIXIR OF TERPEN HYDRATE, COMPOUND.

Terpen hydrate.....	5
Creosote	2
Codeine sulphate.	0.6
Syrup of wild cherry	200
Aromatic elixir.....	300
Dose, 5.00 to 10.00.	

ELIXIR OF THE FOUR CHLORIDES (ELIXIR QUATUOR CHLORIDI).

Mercuric chloride	0.25
Solution of arsenous acid	20
Tincture of ferric chloride	85
Diluted hydrochloric acid	85
Simple syrup.....	250
Aromatic elixir.....	300
Water, to make	1000
Dose, 2.50 to 10.00.	

ELIXIR OF VIBURNUM WITH HYDRASTIS, COMPOUND.

Cramp bark.....	150
Golden seal.....	100
Jamaica dogwood	75
Pulsatilla	20
Aromatics, glycerin, alcohol and water, to make	1000

—West. Drugg., Oct., 1903, 542.

Godfrey's Cordial—Improved Formula.—H. C. Bradford considers the formula of the National Formulary for Godfrey's Cordial to be crude and unscientific, and proposes instead the following one, which obviates the use of molasses and of potassium carbonate :

Oil of sassafras	1 Cc.
Tincture of opium	35 Cc.
Alcohol	50 Cc.
Simple syrup	325 Cc.
Water, enough to make	1000 Cc.

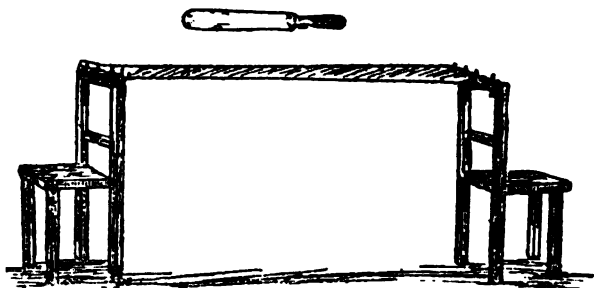
Dissolve the oil in the alcohol and add to the syrup, previously mixed with an equal volume of water. To this add the tincture and enough water to make 1000 Cc. Let stand a day or two and filter. The product will be much lighter in color than the article made by usual formula, but may be colored by the addition of caramel to correspond to that given it by molasses.—Bull. Pharm., May, 1904, 197.

EMPLASTRA.

Adhesive Plaster—Preparation and Spreading.—A. W. Gerrard, in a timely paper on the manufacture and spreading of surgeons' adhesive plaster, says it is a lamentable fact that no branch of pharmacy has suffered more neglect than the manufacture and spreading of plasters during the past forty years, and that so little is known and practiced of the art that in so far as retail pharmacy is concerned it is almost dead. While he does not argue that it would be wise or profitable for pharmacists to spread their plasters in a general way, for it is certain that the work can be better done by the specialist, he maintains that our rising generation should be so educated as to have the opportunity of becoming future specialists, so retaining this branch of legitimate pharmacy in the hands of the pharmacist. Moreover, it is reasonable to expect that every pharmacist should be capable in cases of emergency of spreading at short notice a decent length of surgeons' adhesive plaster or a shaped marginal plaster of any description. During his connection with Guy's Hospital, London, as resident dispenser some forty years ago, the author had abundant opportunity to acquire the art of plaster making and spreading under the guidance of James White, who at that time had an experience of some thirty years, and it is the purpose of the present paper to give an account of the methods practiced in that celebrated hospital, some of which are practically in use at the present day. Omitting the details connected with the manufacture of the plaster mass, it may be mentioned that the essentials of a good adhesive plaster should be, as far as it is possible to obtain them, four leading qualities: (1) Neutrality, (2) freedom from irritating ingredients, (3) a melting or softening point of 98° to 100° F., (4) strong stickiness or power of adhesion. Using a properly prepared lead plaster, carefully deprived of all adhering glycerin and

free from rancidity, the following is recommended as a good working formula for adhesive plaster: Lead plaster, 16; ordinary yellow soap, 1; resin, 1; thus (white turpentine), 1. Shred the soap finely, add to the melted resin and thus, and then add the lead plaster, continuing the heat until all is evenly mixed, then strain. While modernly the spreading of the mass is accomplished by more or less elaborate machinery, this can be satisfactorily done by the simple contrivance shown by Fig. 52, which is

FIG. 52.



Spreading Contrivance.

almost a *fac simile* of that used during the author's dispensership, and many years after, at Guy's Hospital. It consists of two straight-backed chairs, along the top-back rails of which is placed a row of sharp hooks. The cloth, 3 yards long and 12 in. wide, is fixed on the hook and evenly strained. To keep the chair rigid while spreading, heavy weights must be placed on the seats. The plaster, melted in a saucepan, is now poured on one end of the cloth, near the hooks, and drawn smoothly and evenly along the cloth to the other end by means of the large, stout and stiff spatula forming part of the illustration. The spatula must be made warm and worked on its edge. A second portion of plaster is poured on and spread back to the starting point. Any excess of plaster can be picked up by a dexterous move of the spatula and returned to the saucepan. The edges of the spatula require trimming with a sharp pair of scissors, and the plaster may then be cut off at the ends near the hooks and hung till ready for rolling. With this apparatus 60 yards of plaster can easily be spread in an hour, giving as good a plaster, both in quality and appearance, as the more costly modern machines now in use. The best fabrics to employ for spreading the mass on are brown holland, linen, and calico, in the order named; these should be of medium texture, free from dress or filling. Evidence of the excellence of such plaster, spread at Guy's Hospital, was afforded at the time of the Franco-German War, when a number of German surgeons were so well satisfied with it as to make outside arrangements for its supply during the continuance of hostilities.—Pharm. Journ., Feb. 27, 1904, 255, 256.

Rubber Plasters—Estimation of Caoutchouc.—Dr. Karl Dieterich describes two methods for the quantitative estimation of caoutchouc in rubber plasters, but recommends the following, depending on the formation of a nitrosite of the caoutchouc by the method recently described by Harries: 5 to 10 Gm. of the accurately-weighed plaster mass are dissolved in about 150 Cc. of benzol, filtering the solution if necessary. The solution is then refrigerated and nitrous acid gas (produced from 10 Gm. starch, 20 Gm. As_2O_3 , and nitric acid of sp. gr. 1.35) is passed into it for $1\frac{1}{2}$ to 2 hours, or until saturated with N_2O_3 , and then allowed to stand 24 hours, during which the "nitrosite" is deposited. This deposit is then carefully washed on a tared filter, first with benzol, then with ether, finally with water (until a drop of the filtrate yields no turbidity with KI, if lead was a component part of the plaster); the filter and nitrosite are then dried *in vacuo* over sulphuric acid to constant weight, and the weight of nitrosite ascertained by deducting that of the filter. To further control the accuracy, the nitrosite is dissolved in acetone, and any undissolved residue is dried at 100° Cc. weighed and deducted from the previously ascertained weight of nitrosite. The calculation is then made on the basis of the equivalents of the caoutchouc and of its nitrosite; that of caoutchouc ($C_{10}H_{16}$) being 136; of its nitrosite ($C_{10}H_{15}N_2O_7$), 289.—Pharm. Ztg., 48, No. 78 (Sept. 30, 1903) 789-790.

EMULSA.

Emulsions—Value of Acacia as an Emulsifier.—In a "talk" before the Vermont Pharmaceutical Association, Z. B. Hopkins explained the method, and demonstrated the practicability, of preparing emulsions of fixed oils, as well as of oil of turpentine, with acacia as the emulsifying agent. He uses essentially the process advised in the National Formulary for making acacia emulsions of cod liver oil, but thinks that 50 per cent. emulsions are impracticable, and that 25 per cent. emulsions conform more nearly to the popular commercial cod liver oil emulsions, no matter what claim may be made by the manufacturer.—Proc. Vermont. Pharm. Assoc., 1903, 61-65.

EXTRACTA.

Extracts—Character of Crystalline Deposits in Different Kinds.—F. H. Alcock calls attention to some crystals which had been found by him, or submitted to him, as occurring in different extracts. In one case some crystals found in

Extract of Hyoscyamus were submitted to him in the belief that they might prove to be hyoscyamine. It was thought by others that they might consist of potassium nitrate or possibly calcium oxalate. They proved to be "potassium chloride." Some crystals deposited from a liquid alcoholic

Extract of Anacyclus Pyrethrum root were proved to consist of "potassium dihydrogen phosphate," while from

Extract of Meat the author has frequently separated colorless, long, prismatic and transparent crystals, which proved to be "calcium tetra-hydrogen phosphate.—Trans. Brit. Pharm. Conf., 1903, 558-560.

Meat Extract—Detection of Yeast Extract Used as Adulterant.—In view of the many attempts which have been made to utilize yeast extract as a food product, A. Searl considers it important for analysts to be in possession of some method of distinguishing it from meat extract, the more particularly since samples of meat extract, claiming to be made by Liebig's process in South America, that have recently come under his notice, proved to consist almost entirely, if not altogether, of yeast extract. The author states that the following simple test will enable the detection of this lucrative form of adulteration: Make a modified Fehling's Solution by dissolving 200 gr. copper sulphate and 250 gr. neutral sodium tartrate in 4 oz. water; add to this 250 gr. caustic soda dissolved in 4 oz. water. Dissolve 10 gr. of the sample to be examined in $1\frac{1}{2}$ oz. water, and add to it half volume of the above solution, and boil for a minute or two. With genuine meat extract no precipitation occurs, but with yeast extract a bulky, curdled precipitate of a bluish-white color is thrown out, which is almost insoluble in water. When collected, washed, dried and weighed, several samples of yeast extract have been found to give approximately 1 gr. of this precipitate (it looks to the eye more like 20 gr.) from 10 gr. extract.—Pharm. Journ., Oct. 10, 1903, 516.

In a second paper the author mentions that while the proposed test for the detection of yeast extract in meat extracts gives satisfactory results in cases of substitution or gross adulteration of the one with the other, it is not suitable for the detection of small admixtures of yeast extract. By the following method, however, it is possible to detect an admixture of as little as 1 per cent. of the latter: Take 50 to 100 grains of the sample, dissolve it in 1 to 2 drachms of water, and add to the solution sufficient alcohol to throw down all that is insoluble in it. After vigorous shaking, collect the precipitate on a filter, dissolve it in $1\frac{1}{2}$ oz. of water, and test with Fehling's Solution as directed in the preceding paper. In the presence of yeast extract the characteristic bluish-white precipitate will be thrown down, and this may be collected and weighed.—Pharm. Journ., Nov. 14, 1903, 704.

Meat Extracts—Presence of Succinic Acid in Commercial Samples.—Kutscher and Stendel have examined a large number of preparations of fresh muscular tissue, and have come to the conclusion that succinic acid does not exist in the fresh muscles, but is only formed by a putrefactive process when decomposition has set in. But they have at the same time found that all commercial samples of meat extract, of the very best origins, do in fact contain succinic acid, sometimes in quite appreciable quantities, so they consider that for the present the existence of this acid in meat

extract must be left as an open question, and may have no significance.—Chem. & Drugg., June 25, 1904, 1001; from Ztschr. Phys. Chem., 38, 101.

Solid and Fluid Extracts of Ergot—Reliability as Medicinal Representatives of the Drug.—J. Percy Remington makes a plea for a return to well prepared solid and fluid extracts of ergot in place of the numerous specialties that are recommended to the medical profession as representatives of the drug in reliable and increased potency. He regards the fluid extract as the best form to use when the liability of producing nausea is not great, and when a moderately rapid effect is desired; while the solid extract—prepared by the official process of evaporating the fluid extract—though slower in its action, does not have the same tendency to produce nausea, and is preferably given in capsules. For hypodermic use, the best method of administration is to prepare an aqueous sterilized solution of the solid extract in water. Of course, much depends on the careful selection of the ergot (which should be the best obtainable) from which these preparations are made. In the author's opinion, the Spanish rye ergot is superior to all others, and should be used exclusively.—Proc. Pa. Pharm. Assoc., 1903, 135-151.

Extractum Liquiritiæ, Phar. Ital.—Official Requirement.—The new Italian Pharmacopœia requires extractum liquiritiæ to contain at least 75 per cent. of water-soluble constituents, and from 15 to 20 per cent. of matter volatile at 212° (water limit), and not more than 6 to 8 per cent. of ash.—Chem. and Drugg., Nov. 21, 1903, 865.

Licorice Extract—Commercial Examination.—Willard Graham has examined five samples of licorice extract with the following results:

Licorice Extract.	Ash.	Insoluble Matter.
No. 1. Greek Mass.....	4.7	3.2
No. 2. Greek Mass.....	5.3	5.1
No. 3. Greek Mass.....	4.7	5.2
No. 4. Greek Powder.....	4.1	5.8
No. 5. Greek Powder.....	4.8	30.1

Sample No. 5 was found on further examination to contain about 25 per cent. corn starch.—Proc. Pa. Pharm. Assoc., 1903, 224.

Extract of Nux Vomica—Experiments to Determine the Most Efficient Solvent and Method of Preparation.—The "Apotheker Zeitung" publishes a series of eight reports submitted by different experimenters in competition for a prize from the Meyer Endowment, offered by the German Apothecaries' Association for the most creditable investigation concerning the yield, properties and alkaloidal content of extract of nux vomica when prepared with alcohol of different strengths, and under application of different temperatures. Of these interesting reports, which are accompanied by comprehensive tables exhibiting the results, two have been awarded the prize on the ground of equal superiority, and the other six have received honor-

able mention. The conclusion drawn from them point to the process of percolation with diluted alcohol (Pharm. Germ., iv.—REP.) as menstruum and a temperature of 20°–30°, as the most suitable for the largest possible yield of *serviceable* extract and to secure the highest alkaloidal content of such extract. These reports may be consulted in Apoth. Ztg., 19, Nos. 38 and 41 (May 11 and 21, 1904), 325 and 355.

Extractum Rhei, Pharm. Germ.—Modified Manipulation.—J. Lorenzen makes the interesting practical observation that by resorting to maceration and percolation, the extract of rhubarb of the Pharm. Germ. can be prepared more conveniently and economically than when the official method of maceration and expression is resorted to. 500 Gm. of finely-cut rhubarb, mixed with 1 Gm. sodium bicarbonate, are mixed with 300 Gm. diluted alcohol (alcohol 4, water 6), allowed to stand four hours, transferred to a percolator, and after moderately pressing, covered with diluted alcohol of the same strength. After standing ten days, the percolate is drawn off to exhaustion by the use of sufficient additional percolate. In this way, instead of the 1500 Gm. of alcohol required by the official process, only 1000 Gm. (a total of 2500 Gm. of menstruum) were required; while in either case the greater part of the alcohol is recovered by distillation and can be again used, the official method is more wasteful.—Pharm. Ztg., 48, No. 95 (Nov. 28, 1903) 962.

Patent Foods—Nutritious Value.—In a paper on the nutritious value of patent foods, J. Evans observes that the pharmacist has so many calls made upon him in his daily routine for various meat preparations, infants' and invalids' foods, and he is so often asked his opinion on the respective merits of the various preparations, that a review of their composition under proper classification will probably prove useful for reference. The last few years have witnessed such an amazing increase in the number of food preparations placed in the market that one can almost say that we live in the age of patent foods. The improvement in the process of manufacture, the great increase of knowledge regarding the physiology of nutrition, the chemistry and relative prevalence of alimentary substances, have contributed largely to the number and variety of patent foods. Commercial rivalry also adds to the number, each manufacturer claiming his particular preparation to contain those constituents which are of most nutritive value and to be free from those that are of no nutritive value. These preparations are considered under the following captions: Foods derived from Meat, Milk Foods, Malted Foods, Casein Preparations, and Foods of Vegetable Origin. Omitting the details the following may find place here:

Extracts of Meat.—The true nature and value of meat extracts is now becoming more generally recognized. It is pointed out by the author that they are of little real nutritive value, and are only of use in stimulating the appetite. They are food adjuncts rather than true foods. The fol-

following table shows the composition of some of the commercial extracts of meat :

	Liebig's Co.'s Extract. Per Cent.	Bovril Fluid Beef. Per Cent.	Bovril for Invalids. Per Cent.
Water.....	18.35	38.10	21.16
Meat fibre, etc.....	traces	8.40	8.47
Gelatin.....	9.45 (not more than traces of peptones)	3.84	8.19
Albumin.....			
Albumoses.....			
Peptones.....			
Meat bases.....	29.67	12.04	16.13
Non-nitrogenous extractives..	18.85	19.75	29.23
Mineral matter.....	23.68	17.87	16.82

Meat Powders are essentially proteid preparations. In most of them the native proteids have been converted into the soluble form through the agency of enzymes, acids, etc., the products aimed at being the albumoses. In these predigested foods the presence of much peptone is very objectionable, on account of its bitter taste and its tendency to produce irritation of the intestinal canal, thus causing diarrhœa.

Milk Foods are of two kinds, the so-called "humanized milk," and the concentrated foods prepared from cow's milk. The following table shows the comparative composition of human milk, of cow's milk, and of two modifications of "humanized milk" prepared by the Aylesbury Dairy Company, London :

	No. 1.	No. 2.	Human Milk.	Cow's Milk.
Proteids.....	1.33	2.23	2.2	3.5
Carbohydrates.....	4.70	5.22	6.2	4.8
Fat.....	4.05	3.67	3.7	3.6
Mineral matter.....	0.49	0.58	0.3	0.7
Total solids.....	10.57	11.70	12.4	12.6

Concentrated Foods Prepared from Cow's Milk.—To this class belong Allenbury's foods, Horlick's malted milk, and Nestle's milk food. As compared with desiccated human milk, the fat in these preparations is low. Their composition is shown in the following :

	Allenburys' No. 1.	Allenburys' No. 2.	Horlick's Malted Milk.	Nestle's Milk Food.	Desiccated Human Milk.
Moisture.....	1.82	2.24	3.7	5.5	....
Proteid.....	10.70	10.23	13.8	11.0	17.7
Carbohydrates.....	66.61	68.78	70.8	77.4	50.0
Fat.....	16.79	14.94	9.0	4.8	29.8
Mineral Matter.....	4.08	3.81	2.7	1.3	2.4

Malted Foods, unlike the foregoing milk foods, which are complete in

themselves, require the addition of cow's milk in their preparation for use. They possess one advantage over the ordinary cereal preparations, such as oatmeal, and as a food for young infants are quite unsuitable. Certain

Casein Preparations, on the other hand, possess many advantages. They are easily digested and completely absorbed; they can be added to the ordinary diet, and they are tasteless and odorless. In these the casein is rendered soluble by means of a fixed alkali, such being for instance the preparation called "plasmon," which is stated to contain: Moisture, 10.7; proteids, 81.3; fat, 0.7; mineral matters, 7.2.

Cereal Foods, largely used as breakfast foods, and mostly of American origin, are advertised by their manufacturers under greatly exaggerated claims regarding their properties. The following table establishes the composition of some of them as compared with wheat:

	A.	B.	Wheat.
Moisture	5.57	3.06	10.10
Proteids	12.20	12.63	11.10
Carbohydrates (soluble)	6.38	10.91	....
Carbohydrates (insoluble)	69.34	68.32	73.0
Fat	0.87	0.85	1.7
Mineral matter	2.76	1.71	2.4
Fibre	2.88	2.52	1.6

The manufacture of the foods causes a loss of water to some extent and a corresponding gain in proteids and other constituents, but otherwise their food value is practically the same as that of ordinary cereals. Many of these breakfast foods claim that they are pre-digested, or, in other words, that the starch has been converted into the soluble form of maltose or dextrin, but the above figures show that the soluble carbohydrates are present only to a limited extent.—Pharm. Journ., March 12, 1904, 367-369.

EXTRACTA FLUIDA.

Fluid Extracts—How Made and Why Used.—J. P. Remington, Jr., contends that fluid extracts when properly made from carefully-selected material will always appeal to the physician as being the most reliable form for the administration of organic medicines, notwithstanding the many advances that have been made in the last few years in devising dry forms of the highly-organized plant principles; for whatever is gained in convenience of administration and palatability is lost in uncertainty as to whether the tablet, pill or powder possesses the full activity. Of the processes for preparing fluid extracts authorized by the Pharmacopœia, that of repercolation, which originated with the late Dr. E. R. Squibb (1857), is the one to be preferred. This process possesses the following advantages: (1) The resulting fluid extract equals the drugs, weight for weight, because all the matter is extracted. (2) None of the principles are injured, because heat is not applied. (3) Precipitation is less liable to occur, because the fluid

extracts do not require to be adjusted. The disadvantage of the repercolation process, however, is that more care and skill is necessary to carry it out properly. Fluid extracts when properly made are strong solutions of the active principles of the drug in alcohol, and therefore should never be diluted to tincture strength by the addition of diluted alcohol or water, since any reduction in the alcoholic strength will cause precipitation of the active principles. Therefore the Pharmacopœia has never recognized the too prevalent practice of reducing fluid extracts to tinctures. True official fluid extracts are liquid preparations containing all the constituents of the drug in as nearly the natural state as possible, and may therefore be safely depended upon as the most reliable means of administering galenical preparations. They are preferable to tablets, pills and powders because of their greater reliability, and to tinctures because of their concentration. —*Drugg. Circ.*, 48, No. 6 (June, 1904), 119.

Fluid Extracts—Advantages and Disadvantages in the Use of Acetic Acid for their Preparation.—W. O. Gross discusses the question of using acetic acid as a menstruum for preparing fluid extracts and, as a result of his studies and voluminous correspondence with the principal manufacturers of pharmaceutical preparations, outlines the relative advantages and disadvantages as follows :

Advantages.

- a. The economy over alcohol is decided.
- b. Decoctions and infusions can be more successfully prepared from them.
- c. Acetic acid is antiseptic, detergent and preservative.
- d. Prescriptions compounded with acetic acid extract are better than alcoholic extracts on account of lesser amount of precipitation.
- e. Dilutions at the moment of taking are less muddy and unsightly, and the acidulous taste is less disagreeable than the ordinary alcoholic extracts.
- f. Acetic acid does not convert alkaloids into acetates, but acts only as a solvent.
- g. The substitution of acetic acid in the place of sulphuric acid in the aromatic sulphuric preparation of the U. S. P. is a decided advantage on account of the vegetable acid being used in place of the mineral acid.
- h. Many extracts develop the characteristic odor of the drug far more distinctly than the alcoholic extracts.

Objections.

- a. The change is entirely too radical.
- b. Acetic acid extracts are loaded with inert extractive matter.
- c. It revolutionizes all previous theories and conclusions as to what forms the best general solvent for the extractive matter of plants.
- d. The odor of all fluid extracts would be acetous, destroying in a measure the usual means of identity.
- e. Acetic acid extracts would be objectionable to administer to human beings except in those cases where the dose consists of only a few minims of the fluid and then, of course, largely diluted with water.
- f. Acetic acid would modify the reaction, miscibility and compatibility of many drugs.
- g. Nonstability of finished product.
- h. The lack of knowledge of the action of acetous extracts when long continued.

The question of vital interest to the practitioner is, other things being equal, what effect would the administration of acetic acid extracts have on the general system. Would it produce effects differing from those of alcoholic extracts? Would the presence of acetic acid in the stomach retard or impair the process of digestion? Chemical pathology teaches us that acetic acid in small doses possesses slight toxic properties, the nature of whose effects is not yet fully understood.—West. Drugg., Dec., 1903, 652; from Proc. Indiana Pharm. Assoc.

Fluid Extract of Chamomile Flowers—Formula and Precautions in its Preparation.—Having experimentally determined that anthemic acid, the bitter principle of the flowers of *Anthemis nobilis* (which see under "Materia Medica"), although easily soluble in water, is readily decomposed by heat in aqueous solution, even in the absence of a mineral acid, Prof. Henry G. Greenish made the following experiment with the object of establishing a satisfactory formula for a fluid extract: 600 Gm. of English-grown flowers were exhausted by percolation with 70 per cent. alcohol. The first 500 Cc. were reserved and the following, about 1200 Cc., were concentrated by rapid distillation under a pressure of about 150 Mm. to 300 Cc. This liquid was then cooled, and after twelve hours filtered from the yellowish brown deposit. It was further concentrated by distillation to a syrupy consistence, and then measured about 80 Cc. This was added to the reserve, and the still rinsed out with sufficient 70 per cent. alcohol to bring the volume up to 600 Cc. The liquid extract thus obtained has a dark, reddish-brown color, agreeable aroma, and intensely bitter taste. On evaporating one half of this fluid extract by distillation under reduced pressure, 70 Gm. of an

Extract of Chamomile Flowers was obtained. This was firm, of a dark brown color, and had an extremely bitter taste. It remains to be seen whether these preparations retain their bitterness or whether slow decomposition of the anthemic acid takes place, in which event neutralization of the acid present with magnesia or other alkali, must be resorted to.—Pharm. Journ., Dec. 12, 1903, 878.

Extractum Crataegi Fluidum—Formula.—George M. Beringer proposes a fluid extract of Hawthorn berries (*Crataegus oxyacantha*, Gärtner; *Mespilus crataegus*, L.), by a formula which may be outlined as follows:

Hawthorn berries in No. 30 powder.....	1000 Gm.
Glycerin	50 Cc.
Alcohol and water, of each sufficient to make.....	1000 Cc.

The glycerin is mixed with 600 Cc. of alcohol and 250 Cc. of water, and the powder is percolated with this menstruum, followed by a mixture of 2 vols. of alcohol and 1 vol. of water until exhausted. The first 850 Cc. of percolate are recovered, the exhaust percolate is concentrated to the consistence of a soft extract, dissolved in the reserve, and the volume of

the liquid is then adjusted to 1000 Cc. by the addition of alcohol and water mixed in the proportion above indicated.—Amer. Journ., 76, No. 6 (June, 1904), 283-284.

Extractum Galegæ Fluidum—Formula.—George M. Beringer, calling attention to the demonstrated galactagogue value of the herbaceous portion of Goats' Rue (*Galega officinalis*, L.), which see under "Materia Medica," proposes the following formula for a fluid extract :

Goats' Rue, herb, in No. 30 powder. 1000 Gm.
Diluted alcohol, sufficient to make. 1000 Cc.

To be prepared by percolation by the usual official method, reserving the first 900 Cc., evaporating the exhaust percolate to the consistence of soft extract, dissolving this in the reserved portion, and adjusting the total volume to 1000 Cc. by adding sufficient diluted alcohol—Amer. Journ. Pharm., 76, No. 6 (June, 1904), 283.

Fluid Extracts of Liquorice—Critical Comparison of the B. P. and U. S. P. Preparations.—P. Guiges has compared the fluid extracts of liquorice prepared according to the respective formulæ of the British and the United States Pharmacopœias, and considers that the latter is decidedly the better preparation. It has a pleasanter odor and taste and dilutes bright with water, whereas the former is somewhat acrid, and notwithstanding its filtration gives a turbid solution. Moreover, the greater strength of the B. P. preparation is only apparent, being due to further concentration. Working by the two processes on equal quantities of root, the B. P. method gave 59.99 Gm. of dried solid matter and 14.16 Gm. of glycyrrhizin from the 500 Gm. of root employed, whereas by the U. S. P. method the solids extracted were 91 Gm. and the glycyrrhizin 31.95 Gm. from the same amount of root—Pharm. Journ., June 11, 1904, 801; from Journ. Pharm. Chim. (6), 19, 284.

Extractum Nucis Vomicae Liquidum—Modification of the B. P. Process.—S. Judd Lewis has made experiments undertaken with the object of so modifying the B. P. process for preparing liquid extract of nux vomica as to secure the complete removal of the fat. As a result, he recommends the following process which practically attains this end, and is not open to the objection of introducing foreign substances, save a mere trace of acetic acid :

Nux vomica in No. 20 powder 20 lbs.
Alcohol, 70 per cent., q. s.
Alcohol, 90 per cent. 6 pints.
Acetic acid, q. s.
Distilled water, q. s.

Exhaust the drug by percolation with the alcohol 70 per cent. Transfer the percolate to a vacuum still and distil, reducing the pressure *secundum*

artem more and more as the alcohol passes over, so as to keep the temperature as low as possible, until the residual liquid measures about five pints, when, approximately all the spirit will have been recovered; add one gallon boiling distilled water, and render very faintly acid by addition of acetic acid. Set aside for forty-eight hours, in a cold place, collect the separated fat, and boil it two or three or more times with a little water, to free it from alkaloid; mix these washings, and set them aside in a cold place to allow any fat to separate. Mix the aqueous liquids, and evaporate *in vacuo* to two pints; and add alcohol 90 per cent. to the warm liquor, and, when cold, make up to one gallon by addition of distilled water. Determine the strychnine content of the product, and dilute with alcohol 70 per cent. to the pharmacopœial strength.

In conducting the assay of this liquid extract, as well as that obtained by Greenish and Smith's process (see Proceedings 1902, 727), emulsification occurred quite as badly as with that made according to the official formula, indicating that the trouble is not primarily due to fat, but to some other constituent of the drug; and this view is confirmed by the fact that shaking out with chloroform or ether to remove fat does not eliminate, but only mitigates, the trouble.—Pharm. Journ., Oct. 10, 1903, 516.

Extract. Sorbi Aucupariæ Fld.—*Formula and Dose.*—The following formula for a fluid extract of mountain-ash berries is given in "Journ. de Pharm." (1904, No. 1): 1000 Gm. of the fresh berries are triturated, mixed with 500 Gm. of 60 per cent. alcohol, and allowed to stand for some time in a moderately warm place. It is then percolated and a fluid extract prepared in the usual manner with alcohol of the same strength. The fluid extract is recommended as an aperient in doses of 20 drops to half a tablespoonful 2 to 3 times daily.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 137.

GLYCERITA.

Glycerinum Acidi Borici, B. P.—*Modification of Formula.*—The complaint that the B. P. process for preparing glycerin of boric acid is troublesome and requires more time than is desirable, has led to several suggestions with the object of remedying these defects. Thus, D. Gilmour has advocated a plain solution of boric acid in glycerin, without first effecting the formation of glyceryl borate, while J. P. Gilmore points out that by direct heating the preparation can be made in half an hour. George Lunan now records experiments which lead him to suggest the reduction of the boric acid from 6 to 5 ozs., and to heat this with all the glycerin (19 ozs.) at once, until the product is reduced to the official weight of 20 ounces. The mixture begins to boil at 116° C. and reaches 148° C. within 40 minutes, when it is found reduced to 21 ozs.; by thus continuing the heat for 20 minutes below 150° C., it is reduced to the required 20 ozs. The product is perfectly clear and water-white, and

does not differ materially from the B. P. product, except that the conversion into glyceryl borate may not be so complete. It is better to use the boric acid in crystals than in the powder officially directed.—Pharm. Journ., Jan. 2, 1904.

Glycerinum Pepsini, B. P.—Improved Manipulation.—Peter Boa having in his experience obtained varying results when following the pharmacopœial direction for preparing *Glycerinum pepsini, B. P.*, makes some suggestion with the view to improving the process. The official direction is as follows: "Mix the hydrochloric acid, glycerin and 6 fl. oz. of the water; then add the pepsin; after one week pour off the clear liquid, or filter; add sufficient water to produce one pint." The direction to "add the pepsin" after the liquids have been mixed is brief and simple. It may, however, leave the operator in doubt as to whether he should stir the mixture, rub it up, shake it, or leave it alone, and, according to interpretation, it may result in the formation of a tough mass or clot of pepsin, which shows little diminution after frequently shaking during a week. As the pepsin will dissolve quickly and completely in the quantity of water ordered, the author has successfully modified the manipulation by dissolving the pepsin in the water, adding the glycerin in three or four successive portions, shaking after each addition, and lastly adding the acid. In this way the pepsin can be dissolved in a few minutes, and the preparation made ready to set aside to clear or await filtration. Moreover, the necessity to add water after the clearing-up and decanting or filtration of the liquid should be avoided. The measure should be brought to a pint with water as soon as solution is effected and then clarified by subsidence or filtration, or both.—Pharm. Journ., Jan. 23, 1904, 84.

INFUSA.

Infusion of Digitalis—Advantage of Using the Properly Preserved Dry Powder.—See *Digitalis*, under "Materia Medica."

Concentrated Infusion of Digitalis—A Stable Preparation.—Basing his recommendation on an experience of many years, both in the collection of digitalis leaves and the preparation of the infusion, a correspondent ("R") of the "Pharm. Zeitung" recommends the preparation of a concentrated infusion of digitalis leaves, recently collected and rapidly dried, according to the following formula: Infuse 100.0 digitalis leaves in 1000.0 water, strain, filter, add 50.0 glycerin, and evaporate to 100.0. This, in effect, makes a fluid extract, which may be diluted as required, and has been found to retain its activity unimpaired for a year.—Pharm. Ztg., 49, No. 50 (June 22, 1904), 526.

Liquor Rhei Concentratus, B. P.—Criticism and Suggestion of Improvement.—F. C. J. Bird finds that the concentrated rhubarb liquor, when prepared by the special method adopted in the B. P. for the greater number of the concentrated liquors, cannot be considered quite satisfac-

tory, for, on keeping, it almost invariably throws down a brownish-yellow deposit. Moreover, experimental data, which are given in the form of a table, show that only about 60 per cent. of the available extractive of the root is contained in the B. P. liquor. The author finds the addition of glycerin most effective to prevent the formation of a precipitate, and recommends a modification of the official formula, according to which the first 17 fl. ozs. of percolate are reserved, the subsequent 3 fl. ozs. of percolate evaporated to a soft extract, which is dissolved in 3 fl. ozs. of glycerin and added to the reserved portion so as to make 20 fl. ozs. of finished product. A sample of liquor so prepared has remained quite free from deposit for several months. Another very unsatisfactory preparation is the

Liquor Sennæ Concentratus, B. P.—In fact this is the most unsatisfactory of the B. P. liquors, on account of its bad keeping qualities and the deposition, with loss of extractive, when closed for any length of time. Another weak point is found in the process itself, which requires the maceration of the senna leaves with distilled water for a period requiring at least seventy-two hours, or probably much more, if the official directions are strictly followed. In consequence of this prolonged exposure, especially if such be during warm weather, the infusion is liable to decomposition, before it is finished, by heating to 180° F. for five minutes, and the addition of the prescribed quantities of alcohol and tincture of ginger. The process of extraction adopted for the senna is also less efficient than in the case of any of the other liquors, notwithstanding that the extraction is effected by repercolation, for the product, as shown experimentally, contains only from 55 to 56 per cent. of the available extractive of the leaves. With the view to remedying some of these defects, the author suggests that chloroform water should be used instead of distilled water, the chloroform to be driven off by heating to 180° F., as is now directed; that the quantity of alcohol to be added be increased in the formula from 2 fl. ozs. to 2¼ fl. ozs., and that the filtered product, after standing seven days, be again heated to 180° F. in a closed vessel for half an hour or longer until the precipitate aggregates and the supernatant liquor becomes quite clear, then cool and filter. Filtration is now accomplished quite readily; the product is brilliantly clear, and keeps for months without change.—Trans. Br. Pharm. Conf., 1903, 496–500.

LINIMENTA.

Soap Liniment—Improved Formula.—H. C. Bradford recommends the following formula for soap liniment which yields an unexceptionable product, remaining liquid under all changes in temperature, of a light amber color, and of full strength :

B Caustic potash, U. S. P.....	12 Gm.
Camphor	15 Gm.
Olive oil.....	60 Cc.
Oil of lavender flowers	15 Cc.
Alcohol,	
Water, of each, enough to make.....	1000 Cc.

Dissolve the potash in one ounce of water and add the olive oil. Shake or stir well, add one ounce of alcohol (grain or ethyl alcohol !), and again shake well. Now apply the heat of a water-bath, with occasional shaking, until the oil is completely saponified. Should the potash not be of full strength, a fact indicated by the presence of oily drops in the mixture which refuse to combine, add a small quantity (1 or 2 grammes) more, dissolved in a little water, and continue heating until saponification is complete. Care must be exercised not to have any excess of alkali. Now remove from the fire and allow to cool. Add 700 Cc. of alcohol, in which the camphor and oil of lavender flowers have been dissolved, mix well, and add enough water to make 1000 Cc. of product. Let stand a day or two and then filter.—Bull. Pharm., May, 1904, 197.

Soap Liniment—Modified Manipulation.—H. A. B. Dunning finds that the preparation of soap liniment is greatly facilitated by heating the powdered soap with all the available water until a translucent jelly is formed, which is dissolved in the alcohol; the camphor and oils are then dissolved in this solution. By adopting the above plan, soap liniment may be finished immediately, though it is better if allowed to stand for a few days, so that any insoluble matter may be allowed to precipitate before filtering.—Drugg. Circ., 48, No. 2 (Febr., 1904), 29.

Stokes' Liniment—Modification of Formula.—H. A. B. Dunning finds that if only the yolk of the egg be used in making Stokes' liniment, it is very difficult to obtain a creamy emulsion that does not separate. If the yolk and all the white is used, the resulting emulsion is apt to be ropy, and probably too thick. It is suggested that the yolk and half the white will give a more satisfactory emulsion. The finished liniment should be strained through bunting gauze to remove any clots of albuminous matter.—Drugg. Circ., 48, No. 2 (Febr., 1904), 29.

Linimentum Terebinthinæ, B. P.—Improved Method of Preparation.—Wm. A. Knight observes that turpentine liniment prepared according to the official directions requires long and tiring trituration to attain the official requirement of a thick, creamy emulsion, and hence the preparation is dispensed of varying degrees of thickness, according to the patience and persistency of the operator and the strength of his wrist. The following method requires little manipulation, and the product is always of a uniform consistence. For the official quantity, heat 1½ ozs. of soft soap with 5 ozs. water in an enamelled-iron dish over a Bunsen flame until a complete solution is effected; remove from the source of heat and add 4 ozs. oil of turpentine; stir with a pestle for a couple of seconds and pour the result-

ing "primary emulsion" into a bottle; add 1 oz. camphor dissolved in 9 ozs. of oil of turpentine, shake once or twice, and make up to a pint with water. No violent shaking or trituration is required, and the product is a thick cream.—Chem. and Drugg., Dec. 12, 1903, 992.

Chloroforms of Belladonna and Aconite, B. P.—Improvement of Formulas.—In view of the more or less faulty processes for the preparation of the chloroforms of belladonna and aconite, B. P., R. Wright has undertaken a series of investigations and experiments which lead him to some important conclusions, and to recommend a modified formula for the chloroform of belladonna. He finds that while chloroform is well adapted for the extraction of the aconite alkaloids, probably because these exist largely in a free condition in the root, chloroform alone is not a good solvent for the alkaloids of belladonna in their natural state of combination in the drug. Others have called attention to this heretofore, and have prepared modifications, the usual one consisting in the addition of alkali to the crude drug in order to break up the natural combination. The author finds that the addition of 10 per cent. of absolute alcohol gives a greatly improved preparation; but the best results are obtained by the addition of ammoniated alcohol, and the following formula is, therefore, outlined, which is equally adapted to the aconite preparation: Belladonna (or aconite) in fine powder, 20 oz.; a mixture of ammoniated alcohol, 1 volume, and chloroform, 7 volumes, a sufficient quantity. The powder is moistened with 10 fl. ozs. of the menstruum, packed firmly in a percolator, and percolated with menstruum until one pint (= 20 fl. ozs.) of percolate is obtained.—Trans. Brit. Pharm. Conf., 1903, 589–598.

Liniment—A Good Formula.—John Culley recommends the following formula for a liniment which he has found popular in place of the proprietary liniments usually demanded: Menthol, 8 grains; oil of origanum, oil of spike, rectified oil of amber, oil of sassafras, of each 12 fl. drachms; oil of turpentine, enough to make 3 pints. To this add 16 eggs, 10 fl. ozs. of acetic acid (36 per cent.), and 2½ pints of water. Shake occasionally for several days, then bottle for sale.—Merck's Rep., Feb., 1904, 40.

Barb-wire Liniment—Formula.—L. W. Marshall gives the following formula, and directions for use, for "barb-wire liniment," which has proven a good all-round liniment, but particularly useful for wire cuts and wounds to which farm-stock is subject: Oil of turpentine, 1 fl. oz.; tar, 2 fl. ozs.; carbolic acid, ½ fl. oz.; fish oil, enough to make 1 pint. Wash cut or sore thoroughly with warm water and castile soap and apply the liniment once a day for a week, and then two or three times a week until healed.—Merck's Rep., May, 1904, 128.

LIQUORES.

Saturated Saline Solutions—Tabulated Exhibit of Solubilities, Strength and Specific Gravities.—Henry G. Greenish publishes the following table based upon data collected from time to time in the course of studies upon

the solubilities of a number of official (B. P.) salts, which may be put to uses which will readily suggest themselves to the practical pharmacist as well as to the prescriber. The substances are calculated as of official, not absolute purity :

	Specific Gravity of Saturated Solution.	Temp. (Fahr.)	Cc. of Water dissolve 1 Gm.	Gm. in 1 Litre Saturated Sol.	Ounces in 1 Pint Sat. Sol.	Grains in 1 Fl. Oz. Sat. Sol.
Acidum chromicum.....	1.710	61.5	0.59	1075.5	21.51	470.5
Acidum citricum.....	1.3026	61	0.51	861.7	17.23	377.4
Acidum tartaricum.....	1.31	58.5	0.71	766.1	15.32	355.2
Alumen (ammonium).....	1.0459	59.5	9.95	95.5	1.91	41.8
Alumen (potassium).....	1.046	59.5	9.70	97.7	1.95	42.8
Ammonii benzoas.....	1.0413	59	5.1	170.7	3.41	74.7
Ammonii bromidum.....	1.2904	59	1.40	537.7	11.75	235.2
Ammonii carbonas.....	1.094	59.5	3.94	221.5	4.43	96.9
Ammonii chloridum.....	1.077	60	2.8	472.4	9.45	123.9
Antimonium tartaratum.....	1.0400	60	17	57.4	1.148	25.0
Borax.....	1.0206	62	23.69	41.3	0.83	18.1
Calcii chloridum (CaCl ₂).....	1.4096	60	1.41	584.6	11.69	255.8
Calcii chloridum (CaCl ₂ ·2H ₂ O).....	1.4096	60	0.82	774.2	15.48	338.7
Chloral hydras.....	1.513	61.5				
Cupri sulphas.....	1.193	61	2.79	314.8	6.29	137.7
Ferri sulphas.....	1.2188	62	1.49	489.4	9.78	214.1
Hydrargyri perchloridum.....	1.0472	60	17.9	554.0	11.08	24.2
Magnesi sulphas.....	1.2755	60	0.98	643.9	12.88	281.7
Plumbi acetas.....	1.2554	60	2.37	372.5	7.45	163.0
Potassa caustica.....	1.553	60	0.647	942.9	18.86	412.5
Potassii acetas.....	1.406	59	0.279	1099.2	21.08	480.9
Potassii bicarbonas.....	1.1688	60	3.21	277.7	5.55	121.5
Potassii bichromas.....	1.0660	60.5	9.93	97.5	1.95	42.7
Potassii bromidum.....	1.3615	60	1.59	525.7	10.51	230.0
Potassii chloras.....	1.0380	61	16.53	59.2	1.18	25.9
Potassii citras.....	1.520	60	0.55	980.6	19.61	429.0
Potassii iodidum.....	1.7039	69.5	0.701	996.4	19.92	435.9
Potassii nitras.....	1.1452	60	3.77	240.1	4.80	105.0
Potassii permanganas.....	1.0368	60	18.7	52.7	1.05	23.02
Potassii sulphas.....	1.0784	60.5	9.65	101.3	2.02	44.3
Potassii tartras.....	1.490	60	0.625	916.9	18.33	401.3
Soda tartarata.....	1.2713	59	1.138	594.6	11.89	260.1
Sodii arsenas.....	1.1765	60	4.88	200.0	4.00	87.5
Sodii benzoas.....	1.1643	59.5	1.64	441.0	8.82	192.9
Sodii bicarbonas.....	1.0608	63	11.08	87.8	1.76	38.4
Sodii bromidum.....	1.523	61.5	1.126	716.4	14.33	313.4
Sodii carbonas.....	1.1608	61	1.66	436.4	8.73	190.9
Sodii chloridum.....	1.204	61	2.8	316.8	6.34	138.6
Sodii hypophosphis.....	1.3880	61	0.65	851.5	17.03	372.5
Sodii iodidum.....	1.8937	59	0.577	1200.9	24.01	525.4
Sodii nitris.....	1.3474	60	1.36	570.9	11.42	249.8
Sodii phosphas.....	1.0489	59	6.91	132.6	2.65	58.0
Sodii salicylas.....	1.2484	59.5	0.83	682.2	13.64	298.5
Sodii sulphas.....	1.1114	59.5	2.68	302.7	6.05	132.5
Sodii sulphocarbonas.....	1.0697	59.5	5.48	164.7	3.29	72.0
Zinci acetas (2H ₂ O).....	1.165	60	2.40	336.7	6.73	147.3
Zinci acetas (3H ₂ O).....	1.165	60	2.11	374.6	7.49	163.9
Zinci sulphas.....	1.452	59.5	0.65	880.0	17.60	385.0

Liquores Triplices is the generic name for concentrated solutions of certain medicaments, for which the name "Triquoers" (see under "New Remedies") has more recently been proposed, and of which the "Liquor Ferri Mangani Peptonati Triplex," for which a formula is given below, is an example.

Liquor Aluminii Acetici—Preparation from the Refined Commercial Sulphate.—Kurt Beysen discusses the difficulties encountered in the preparation of solution of aluminium acetate. He has been able at times to obtain refined aluminium sulphate perfectly free from iron, and with such prepared a satisfactory solution by the following formula: Aluminium sulphate (refined), 1 Kgm.; water, 3.5 Kgm.; calc. carb., 0.433 Kgm.; dil. acetic acid, 1.2 Kgm. After the reaction the liquid is strained, without pressure, and yields 4.5 Kgm. of finished solution.—Pharm. Ztg., 49, No. 12 (Febr. 10, 1904), 126.

Liquor Antimonii Chloridi—Unsatisfactory Commercial Quality.—Having occasion to make some experiments with solution of antimony chloride and certain salts of strontium and barium, F. H. Alcock obtained, after some time, dense precipitates, which on examination proved to be largely composed of strontium and barium sulphate. Direct assay of 10 Cc. of a sample yielded 4.817 Gm. BaSO_4 , and there was also iron present to the amount of 2.75 Gm. in 100 Cc. Inquiry revealed the fact that very little of this antimonial solution, official in the B. P. 1885 but since dropped, is prepared in accordance with that standard. How made is not explained.—Pharm. Journ., Nov. 28, 1903, 809.

Solution of Chlorinated Soda—Inefficiency of the Formula of the U. S. P. 1890.—H. V. Arny and J. F. Wagner, noting that samples of a solution of chlorinated soda prepared by the class in pharmaceutical chemistry invariably proved deficient in chlorine when assayed, undertook a series of investigations in order to determine the fault, if any, and now report the details and result of their experiments, which lead them to the following conclusions:

(1) The process of manufacture of solution of chlorinated soda given in the Pharmacopœia of 1890 will not yield in the hands of the average operator a product of official chlorine strength.

(2) It leads to loss of chlorine, and that at every stage of the operation; part being retained by the incompletely washed chlorinated lime, and part lost by vaporization.

(3) The process of the U. S. P., 1880, is even more wasteful of chlorine than is that of 1890, the chief loss, however, being retention of chlorine in the chlorinated lime residue, the loss in evaporation being much less. But, altogether, it is a more sensible process than that of 1890, the chlorine strength being easily within the limits of the Pharmacopœia.

(4) While the process of 1880 is more wasteful of chlorine, the finished

solution is a stronger one than that yielded by the process of 1890.—*Amer. Journ. Pharm.*, 76, No. 6 (June, 1904), 258-267.

Cresol Solutions—Analytical Separation of Soap and Hydrocarbons.—The separation of soaps, hydrocarbons and cresols in the various commercial antiseptic fluids sold under fancy names is accomplished by Otto Schmatolla as follows: A definite volume of the fluid is decomposed with dilute sulphuric acid in presence of a known volume of petroleum ether (about equal in bulk to that of the fatty acids and cresols that will separate); of the ethereal layer an aliquot part is evaporated with some ether, and yields data for calculating fatty acid and cresol and hydrocarbon. The weighed residue so obtained, diluted with alcohol until the color becomes pale yellow, is titrated with standard alkali in presence of a fair amount of phenolphthalein. This gives fatty acid (calculated on an average molecular weight) and difference = cresol and hydrocarbon. To determine hydrocarbons, a known quantity of original fluid is treated with its own volume of 15 per cent. potash, and shaken three times with petroleum ether, which takes up hydrocarbon only. Total alkali is separately determined by titration with standard acid, using methyl orange as indicator. *Nat. Drugg.*, Nov., 1903, 321; from *Chem. Ztg.*, 1903, 634.

Embalming Fluid—Composition and Process.—It is stated in "Pharm. Praxis" that bodies embalmed with a solution of formalin, carbolic acid and common salt will preserve the body for a long time. The fluid is injected into the cranial cavity through the nostrils, and into the remaining parts of the body through the urethra.—*D. A. Apoth. Ztg.*, June, 1904, 44.

Embalming Fluid—Formula.—Julian L. Waller communicates the following formula for an embalming fluid which he prepared and which was satisfactorily used for embalming the body of King Kalakaua: carbolic acid (Merck's), 48 Gm.; arsenious acid, 2 Gm.; mercury bichloride, 2.5 Gm.; alcohol, 80 Gm.; glycerin, 20 Gm.; distilled water, 120 Gm.—*Merck's Rep.*, Aug. 1903, 217.

Fehling's Solution—Spontaneous Change.—L. Routhaler has observed that when freshly prepared Fehling's solution is treated immediately after the admixture of the copper and Rochelle salt solution with HCl, drop by drop, until it reacts acid, no change other than the normal one resulting from the reaction is noticed. If then the alkalinity is restored by the addition of soda solution, the liquid assumes its original appearance. But if the test is repeated after one hour, the addition of HCl will occasion a precipitate of cuprous oxide so long as the liquid remains alkaline, this precipitate redissolving on the further addition of acid. If the acid solution is then again rendered alkaline with soda solution in excess, and heated, a precipitate of cuprous oxide is again formed, its quantity being greater with the increase in age of the Fehling's solution. The author shows experimentally that this change is due to the conversion of the tar-

taric acid into dioxy-tartaric acid in the alkaline Rochelle salt solution, and, as a practical deduction, emphasizes the necessity of operating with absolutely freshly prepared Fehling's solution. This will prevent error even if the liquid under examination has an acid reaction. If, however, it is desirable to use an older Fehling's solution which has been proven not to precipitate when heated by itself, the liquid to be tested, if acid, should first be neutralized.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 589-592.

Fehling's Solution—Aid to Recognition of End-point in Sugar Determinations.—S. A. Vasey finds that the addition of a quantity of precipitated calcium carbonate or finely powdered barium sulphate facilitates the recognition of end-point in sugar determinations with Fehling's solution. The mixture of a measured quantity of this solution with about two teaspoonfuls of either of the compounds named is heated to the boiling point and the sugar solution is run in, the mixture being constantly stirred until the supernatant fluid becomes colorless—the exact point being easily recognized by the complete and rapid precipitation of the cuprous oxide, which is carried down by the chalk or barium sulphate, leaving the liquid limpid and transparent.—Lancet, 184 (1903), 1, 137.

Fehling's Solution—Use of Potassium Iodide as Indicator in Sugar Determinations.—E. F. Harrison, who has employed Fehling's solution somewhat extensively in quantitative sugar estimations, has found the indicators usually recommended to determine the end-point of reaction to be unsatisfactory. It was suggested by him that the action of cupric salts in liberating iodine from iodide might be utilized for this purpose with advantage, and his experiments determine the superiority of this over the other indicators heretofore proposed. The indicator is prepared by boiling 0.05 Gm. of starch with a few Cc. of water, adding 10 Gm. of potassium iodide and diluting to 100 Cc. This indicator should be prepared as required. In use 0.5 to 1.0 Cc. of this solution is acidified with about 5 or 10 drops of acetic acid, and one drop or more of the liquid in process of titration added. As long as unreduced copper is present, a color is produced, varying from red to blue, and of greater or less intensity, according to the nearness of the end-point. The production of no color marks the end of the reaction. The indicator is available with one drop of a solution containing one part of cupric sulphate in twenty-thousand parts.—Trans. Brit. Pharm. Conf., 1903, 568-569.

Liquor Ferri Albuminati—Importance of Fresh Egg-Albumen and Increased Quantity for its Preparation.—Following the formula of E. Dieterich, the Germ. Pharm., iv., directs the use of pure dry egg-albumen for the preparation of liq. ferri albuminati. Dr. Deér Endre, however, calls attention to the fact that the so-called "pure albumen" of commerce is usually a partly decomposed product, containing much insoluble denaturated

albumen, and speaks commendably of the use in the formula of the Pharm. Helv., iii., of fresh egg-albumen in place of the commercial dry product. He finds, however, that even this formula is not entirely satisfactory, owing to the difficulty in separating the precipitated iron albuminate, which assumes a voluminous condition with the proportion of albumen used, and the manipulation directed. These difficulties are avoided if the prescribed quantity of 200 p. of fresh egg-albumen is increased to 250 p.—in winter even somewhat more because of apparent inferior concentration—and if, reversing the official method of manipulation, the diluted and warmed solution of ferric oxychloride is added in a thin stream to a warmed and diluted albumen solution. This secures an excess of albumen throughout the process of precipitation, and thus avoids the partial solution of the precipitate due to the excess of the iron solution. The iron albuminate is deposited as a dense precipitate which is easily separated from the supernatant fluid. Concerning the stability of solution of albuminate of iron, the author points out that its gelatinization may be prevented by the addition of a little sugar and reducing the amount of alcohol, 5 per cent. of sugar being sufficient to produce an almost indefinitely stable preparation.—Apoth. Ztg., 19, No. 21 (March 12, 1904), 171.

Liquor Ferri Mangani Peptonati "Triplex"—*Formula for an Acceptable Preparation.*—Riemer observes that the published formulas for liquor ferri mangani peptonati, even those published by such authority as, for instance that of the German Apothecaries Association, do not produce a product that is acceptable to the taste; hence the preparations of pharmacists are usually rejected, and those of special manufactures in popular demand. He therefore offers the following formula for a solution of triple strength, which, when properly prepared and diluted, will successfully compete with the best commercial products, and in its concentrated form (designated as "triplex") will keep indefinitely: Take 500 p. of *Peptone* (Witte), dissolve it in 5000 p. of hot water, filter the hot solution, allow it to cool and add in a thin stream, with continuous stirring, 9000 p. of *Liq. ferri oxychlorat.* (Phar. Germ.). When the mixture has become clear, neutralize it (carefully) with 180 p. of *Liq. ammon. caust.* (s. gr. 0.960); wash the precipitate produced, express, diffuse it in a mixture of 8750 p. of *Syrup* (2 sugar, 1 water) and 400 p. of *Liq. ammon. caust.*, and heat it gently in a covered enameled vessel on the steam bath, until the iron peptonate is dissolved and a clear solution is formed. Now add a solution of 300 p. of *Citric acid* in 750 p. each of *Liq. ammon. caust.* and *distilled water*, and, finally, 250 p. of *Manganese citrate* (obtained by saturating a solution of 162 p. of citric acid slowly with 107 p. of pure manganese carbonate and heating to drive off CO_2). Continue the heat until the excess of ammonia is completely driven off (an operation requiring with the quantities prescribed about 2 hours), and then adjust the weight

of the *Liquor ferri mangani pepionati* "triplex," so produced, to 16660 parts. This product when suitably diluted, yields a solution of ordinary strength, containing 0.6 per cent. Fe and 0.1 per cent. Mn. The dilution is effected, as needed, by adding to 166 p. of the "triplex" solution enough water to make 400 p.; then adding, in a thin stream, a mixture of 1 p. of *Benedictine cordial* and 50 p. each of water and alcohol. The product scarcely needs filtration. When properly prepared it is clear when viewed by transmitted light, faintly turbid by reflected.—Apoth. Ztg., 19, No. 12 (Feb. 10, 1904), 94.

Lime Water—Suggestion of Pharmacopœial Changes.—M. I. Wilbert discusses the peculiarities and shortcomings of the official lime water, and with the object of eliminating these, suggests the following pharmacopœial changes in the formula and directions: (1) Increase the relative amount of lime and permit the use of successive quantities of water. (2) Direct the lime water to be dispensed clear, and that when filtered the first portion of filtrate be thrown away. (3) Direct that freshly calcined lime, or lime that has been carefully preserved from the action of the atmosphere, be used, and that it be comparatively free from carbonate. (4) Indicate a minimum as well as a maximum content of calcium hydrate, and call attention to the desirability of testing lime water, from time to time, with a view to keeping it within the prescribed standards.—Amer. Jour. Pharm., 76, No. 2 (Febr., 1904), 66–70.

Essence of Pepsin—A Satisfactory Formula.—Joseph Herb recommends the following formula for preparing essence of pepsin as producing a very satisfactory product: Dilute one-half of a pint of brandy with one and one-half pints of distilled water, add one ounce of sweet milk, shake well, and filter through paper. Dissolve one ounce of pepsin (1:3000) in two pints of water, mix this with the filtrate previously obtained, add eleven drachms of muriatic acid (31.9 per cent.) previously diluted with distilled water, and 1 pint of glycerin, adjust to 5 pints, and filter through paper pulp. In this way clarification is rapid. Other clarifying agents do not answer so well.—Proc. Wisc. Pharm. Assoc., 1903, 50–53.

Solution of the Suprarenal Gland—Simple and Efficient Formulas.—After a brief review of the pharmacology of the suprarenal gland, Dr. J. C. McWalter communicates the formula for the preparation of solution of the suprarenal gland, the one from the adrenals of the sheep, the other from the adrenal capsule of the heifer, which, in his opinion, will enable the pharmacist to prepare conveniently and supply very active solution of the gland, and quite as efficient as the American solution of the active constituent adrenalin. In the *first formula* he directs that 5 parts of finely chopped adrenals of the sheep, 1 part of alcohol, 0.1 part of acetic acid, 1 part of glycerin and 3 parts of distilled water, be macerated together for 72 hours and the liquid pressed through lint. The resulting liquor has an odor suggestive of well-made liquor pepsin, a pleasant taste,

a somewhat thickish consistency, and may be used for all the ordinary purposes for which adrenalin solution is employed. In the *second formula* he directs 10 parts of the adrenal capsule of the cow, 1 part of boric acid, 2 parts of glycerin, 6 parts of distilled water and 2 parts of alcohol, be treated precisely in the same way—the yield being about 12 parts. The precautions necessary are: fresh glands; second, if possible with the natural covering of fat, scrupulous cleanliness throughout of vessels, implements and containers, sterilization of the knives used for cutting the glands by heating them previous to use. The solution made by the second formula appears to keep better than the American ones, which are peculiarly prone to decomposition.—Pharm. Journ., Aug. 22, 1903, 308.

MELLITA.

Oxymel Scilla—*Qualitative Test for Glucose in the Honey Used*.—An examination of eleven samples of oxymel of squill from different makers by E. W. Lucas revealed the presence in two of them of considerable quantities of glucose as well as variations in the color, density and acidity of the samples. The detection of glucose may be effected as follows, either in the oxymel or in the honey that is to be used as follows: One volume of the sample is mixed with four volumes of water, and filtered through animal charcoal, the filtrate being returned until it passes through nearly colorless. It is divided into two portions. To one is added five volumes of absolute alcohol. Genuine honey gives only a slight opalescence, while an opaque precipitate forms at once if glucose is present, even as little as 20 per cent., this being dependent on the fact that dextrinoid bodies are more insoluble in strong alcohol than the carbohydrates of genuine honey. To the second portion of filtrate one drop of volumetric iodine solution is added. Pure honey has no effect upon the iodine; but if glucose is present the iodine is at once bleached, as the former rarely contains less than 0.05 per cent., and frequently as much as 0.1 per cent. of sulphurous acid. If then more iodine is added, drop by drop, the slightest excess gives rise to a reddish-brown color, due to the amylo- and erythro-dextrine present. In the polariscope, honey containing glucose is strongly dextro-rotatory, while genuine honey is laevo-rotatory, the direct readings ranging from -2° to -15° on the sugar scale.—Pharm. Journ., Nov. 28, 1903, 778.

MISTURE.

Basham's Mixture—*Revision of Ferric Strength*.—Joseph W. England, in an interesting paper concerning the origin of Basham's Mixture, points out that when this valuable medicament was adopted into the U. S. P., 1880, under the name of "Mistura Ferri et Ammonii Acetatis," a radical departure was made in the strength of the preparation, and again in the U. S. P., 1890, practically reducing the amount of tincture of ferric chlor-

ide to one-half the original strength. Incidentally, also, the amount of solution of ammonium acetate was reduced, thus giving a preparation which has lost in popularity on account of its absurd weakness. Calculation shows that each dessertspoonful (the usual dose) of the official Basham's Mixture contains about $\frac{1}{2}$ grain of ferric acetate, $\frac{1}{3}$ grain of ammonium chloride and $\frac{1}{4}$ gram. of ammonium acetate, quantities entirely too small to be of much therapeutic value. The older formulas represented twice as much iron and two and a half times as much ammonium acetate. Historically it is interesting to note that the preparation originated with Dr. William Richard Basham, a physician to the Westminster Hospital, London, from 1843 to 1877, the latter being the year of his death, and that, so far as it can be learned, it was first made public in this country in 1876, in the Formulary of the Philadelphia Hospital under the name of "Mistura Ferri Chloridi Composita" (Basham's Mixture).—Proc. Pa. Pharm. Assoc., 1903, 220-223.

Brown Mixture—Modification of Official Formula.—By using the purified extract of licorice, Paul Caldwell obtains a clear brown mixture, as follows: Mix all the ingredients except the mucilage; add magnesium carbonate and filter clear; then add the mucilage hot, in small quantities each time.

Mixture of Rhubarb and Soda is obtained clear by mixing the fluid extracts, spirit of peppermint and glycerin, and allowing the mixture to stand 24 hours or longer; then adding the sodium bicarbonate, previously dissolved in the water, and filtering the mixture.—So. Drug. Journ., Dec., 1903, 186.

MUCILAGINES.

Mucilage of Gum Arabic—Addition of Lime Water.—Trautmann recommends that mucilage of acacia be prepared with water containing about 10 per cent. of lime water. The gum should be introduced into a tared bottle, washed thoroughly with water, drained well, and the necessary quantity of distilled water and lime water added, the capacity of the bottle being such that it is about four-fifths filled. The gum should be allowed to dissolve slowly by periodically turning the bottle lying lengthwise, and when dissolved, the mucilage should be drained without pressure and filled in small bottles up to the cork, and sealed with paraffin.—Pharm. Ztg., 48, No. 76 (Sept. 23, 1903), 774.

Mucilages of Linseed and Salep—Composition.—H. Hilger has examined the mucilages of linseed and salep. The former he finds to be a mixture of pentanes and hexanes in about equal proportions. Hydrolyzed with 0.5 to 1.0 per cent. sulphuric acid it yielded galactose, glucose, arabinose and xylose, together with a body of acid nature. In composition it corresponded with the formula $2(C_6H_{10}O_5) \cdot 2(C_5H_8O_4)$. Salep mucilage appeared to be a tetra-saccharide of d-mannose, and yielded by

hydrolysis only d mannose.—Pharm. Journ., June 11, 1904, 800; from Ber. d. Deutsch. Chem. Ges., through Ztschr. f. Unters. Nahrungs. u. Genuss., 7, 614.

OLEA.

Iodoferrated Cod-Liver Oil—Preparation and Examination.—As the result of circumstantial research, Guldensteeden-Egeling points out that the ability to absorb iodine varies considerably in different sorts of cod-liver oil, and that, therefore, in following a general formula for iodoferrated oil—such, for example, as that of the Dutch Pharmacopœia, in which 5 p. iodine are dissolved in 394 p. of cod-liver oil, and then shaken with 10 p. of powdered iron—the content of iodide of iron must vary according to the quantity of iodine that is directly combined with the oil. He proposes in this connection the following simple method for determining the iron content: Iodoferrated cod-liver oil, 20 Gm., alcohol, 20 Cc., and 30 per cent. solution of potassium hydrate, 10 Cc., are heated for one hour on a water-bath, shaking the mixture occasionally—preferably using a reflux condenser. Then 150 Cc. of water are added and the heating continued one hour longer. The precipitated ferric hydroxide is collected and washed on a filter, dissolved by heating with 20 Cc. of diluted sulphuric acid, the solution filtered, the filter being washed with a little water, and having added 1–2 drops permanganate solution (0.5 per cent.), heating the filtrate and washings until the red color disappears. The liquid is allowed to cool, 2 Gm. of potassium iodide dissolved in it, and after standing one hour it is titrated with $\frac{1}{10}$ N. thiosulphate solution.—Pharm. Ztg., 49, No. 10 (Febr. 3, 1904), 103.

Phosphorated Oil—Improved Method of Preparation.—After briefly reviewing the various pharmacopœial methods, and their defects, for preparing phosphorated oil, Dr. Deér Endre recommends the following method, by which he accomplishes the dehydration of the oil and the rapid and complete solution of the phosphorus in it: 198 parts of *almond oil* and 10 parts of anhydrous *sodium sulphate* are heated for half an hour, with frequent agitation, in a water-bath and allowed to cool to about 50° C., 1 part of dried *phosphorus* is then added and the mixture is vigorously shaken until the solution of the phosphorus is effected, this being facilitated by the mechanical action of the sodium sulphate and usually complete in a few minutes. Then, after adding 1 p. of limonen, citren, or absolute alcohol to the solution, it is allowed to stand several hours, when it may be decanted clear into small, well-dried vials.—Apoth. Ztg., 19, No. 21 (March 12, 1904), 171.

Phosphorated Oil—Preparation and Preservation.—Among the means recommended for retarding the oxidation of phosphorus in phosphorated oil, the addition of limonen and the saturation of the oil with carbon dioxide have been recommended as efficient. Kremel, however, states

that the addition of absolute alcohol is most efficient, and he also prefers olive to almond oil as the solvent. The solution is prepared as usual by agitating the phosphorus in the warm oil, and 5 per cent. of absolute alcohol is added to the cooled product.—*Zeit. des Allgem. Oest. Apot. Ver.*, 1903, 597.

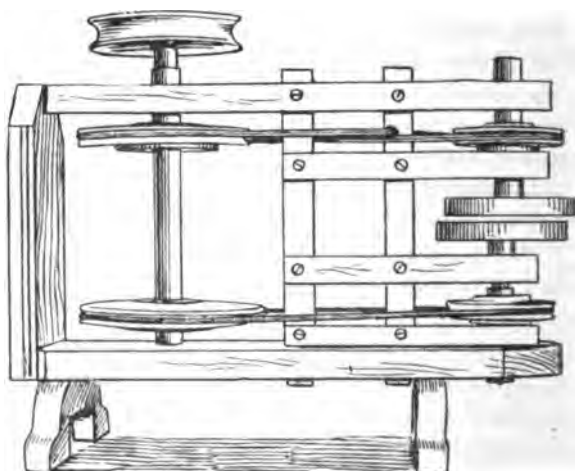
Phosphorated Oil.—Improved method of estimating the content of phosphorus, which see under "Inorganic Chemistry."

Hypodermic Solutions of Mercuric Iodide in Oils—Solubilities, etc.—See *Mercuric Iodide* under "Inorganic Chemistry."

PILULÆ.

Pills—Mechanical Roller for the Prescription Counter.—Burt E. Nelson has devised the ingenious apparatus shown by Fig. 53, for rolling the partially rounded pills as they come from the ordinary cutter. It consists

FIG. 53.



Mechanical Pill Roller.

essentially of two eccentrically placed parallel disks, which are made to revolve at a uniform rate of speed in opposite directions. The opposing face of the upper disk has cemented to it a thin, soft rubber dam, and the distance between the disks may be accurately adjusted by means of a screw which bears against the lower end of the inferior shaft, the bearings being made loose for that purpose. The lower disk is made very slightly thinner at its outer edge. The upper shaft is hollow, and through it the unfinished pills are fed. The bearings and pulleys are of hard wood, the 5-inch disks of vulcanite composition and the shaftings of $\frac{3}{4}$ -inch steel; the opposite rotations of the disks being obtained by crossing one of the

bands. The amount of eccentricity of the two disks is adjustable. The whole is driven by a band from a small pulley attached to an electric fan. The pills may be fed rapidly, but better singly into the upper shaft, and all emerge at the same point between the disks, owing to the equal rates of opposite rotation, thus allowing of their being caught in a pan containing some powder placed there for the purpose. The apparatus, in its entirety, occupies about 2 square feet of space.—*Amer. Drugg.*, 43, No. 2 (July 27, 1903), 31; from *Proc. N. Y. State Pharm. Assoc.*, 1903.

Blaud's Pill-mass—A Desirable Formula.—In order to prevent the delay, necessitated by waiting for the chemical reaction to be completed, to insure a pill that will not readily change, and for the convenience of dispensing in prescriptions that order a number of grains of Blaud's pill-mass in conjunction with other drugs, as is now often the case, the following formula is suggested by H. A. B. Dunning:

Iron sulphate, crystallized	480 grains.
Potassium carbonate	280 grains.
Powdered sugar.....	40 grains.
Glucose	280 grains.
Glycerin	80 grains.
Powdered licorice.....	240 grains.

Rub the iron sulphate, with the sugar, to a fine powder, and in a separate mortar the potassium carbonate to a fine powder. Mix the two, and triturate together until a smooth green paste is obtained; then incorporate the licorice, the glucose and the glycerin. The pill-mass so obtained will retain its plastic condition for several months without decomposition, and when desired for making the pills simply requires kneading in the mortar— $7\frac{1}{2}$ grains of it being required to make a 5-grain pill.—*Drugg. Circ.*, 47, No. 11 (Nov., 1903), 226.

Blaud's Pill-mass—A Form Suitable for Pills or Tablets.—Wm. J. Lowry, Jr., has made experiments with the object of securing a mass for Blaud's pills that will retain the iron in a ferrous condition. He has succeeded well with the carbonates and bicarbonates of sodium and of potassium, and finds the bicarbonates to be better, and that of sodium to be the best for producing a satisfactory mass—the formula recommended being as follows: Ferrous sulphate (crystals), 25 ozs.; sodium bicarbonate, $15\frac{1}{2}$ ozs.; sugar, 4 ozs.; ether, 3 ozs.; starch, 3 ozs.; glucose, tragacanth, each, q. s. Divide into 4,375 pills. The two salts and the sugar in moderately fine powder (No. 30) were roughly mixed on a sheet of paper, and the mixture gradually transferred to an earthen-ware bowl over a steam bath—the temperature not allowed to rise above 150° F., and the mixture stirred until reaction ceased. The starch and ether were next added,

followed by enough glucose and a small amount of tragacanth to make a good workable mass. The pills were rolled in starch, placed in pans and allowed to dry for a space of three months. Thus obtained they were of a light olive-green color externally and of a very light grayish-green on the inside, and readily flattened, or rather crumbled under the thumb. Using the proper proportion of potassium salt (20 ozs. bicarbonate to 28 ozs. ferrous sulphate), the resultant pills were the same, the sodium salt being preferable only on account of convenience (being always powdered) and because more economical. The carbonates produce pills which, although fairly light-green internally, are somewhat harder, and are of a brownish-green color externally. Omitting the addition of glucose and tragacanth, any of the masses obtained can be reduced and preserved in the state of powder, either to be subsequently used for extemporaneously making pills, or for making tablets; used for the latter purpose, also, the mass obtained with sodium bicarbonate appears to be the best for color.—Proc. Md. Pharm. Assoc., 1903, 89-91.

Pilula Ferri, B. P.—Improved Formula.—In a previous paper E. W. Lucas and H. B. Stevens pointed out that pills of iron made strictly according to the B. P. directions would not maintain their strength for any length of time. They have since made a large number of experiments which prove to their satisfaction that either honey or glucose is equally efficient as preservative, but that glucose possesses the advantage of producing a pill which retains its shape and plastic condition for a long period. The pills are made as follows: Mix quickly 150 grains of glucose, 30 minims of distilled water, and 150 grains of exsiccated sulphate of iron in fine powder, add 150 grains of excicated sodium carbonate in fine powder, mix, set aside for ten minutes, or until the reaction is complete, and mass with 15 grains of tragacanth and 50 grains of acacia.—Pharm. Journ., Sept. 12, 1903, 400.

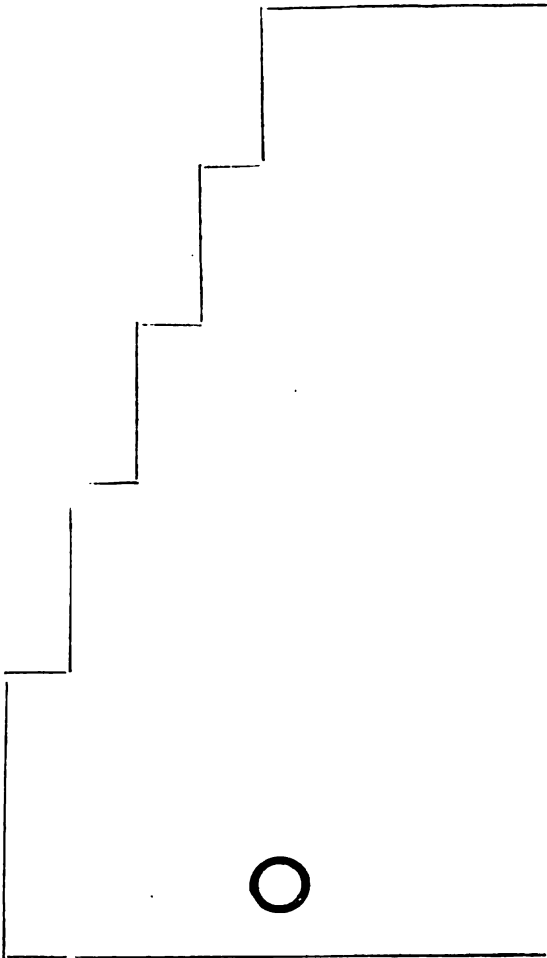
Pilula Ferri, B. P.—Determination of Ferrous Carbonate.—J. H. Gough recommends the following simple method for determining the ferrous carbonate, which is the titration of the latter in phosphoric acid solution with a solution of bichromate containing 2.115 Gm. of $K_2Cr_2O_7$ in the liter. The method is carried out as follows: remove the coating from the pills, cut them into small pieces and weigh 1 Gm., place in a flask with 5 Gm. Acid. Phosph. Dil., B. P., and 10 Cc. of distilled water, heat quickly to 150° F., shake until entirely dissolved, and make up to 100 Cc. with water. Of this solution take 50 Cc. and titrate in the usual manner with the bichromate solution. The quantity of pil. ferri thus taken is 0.5 Gm. and should contain 0.1 Gm. (= 20 per cent.) of ferrous carbonate. By using the above described solution of bichromate, 20 Cc. of it are required to convert 0.1 Gm. of $FeCO_3$ into the ferric state. Consequently each Cc. of the bichromate solution used indicates 1 per cent. of ferrous car-

bonate in the sample under the conditions of the test.—Pharm. Journ., Dec. 12, 1903, 880.

PULVERES.

Powder Folder—A Simple Device.—W. O. Frailey describes the powder folder shown by Fig. 54, which he finds very convenient for folding powders of different dimensions. It consists of a plate of heavy brass, or copper, or iron, cut into the shape shown, with a hole in one end, through

FIG. 54.



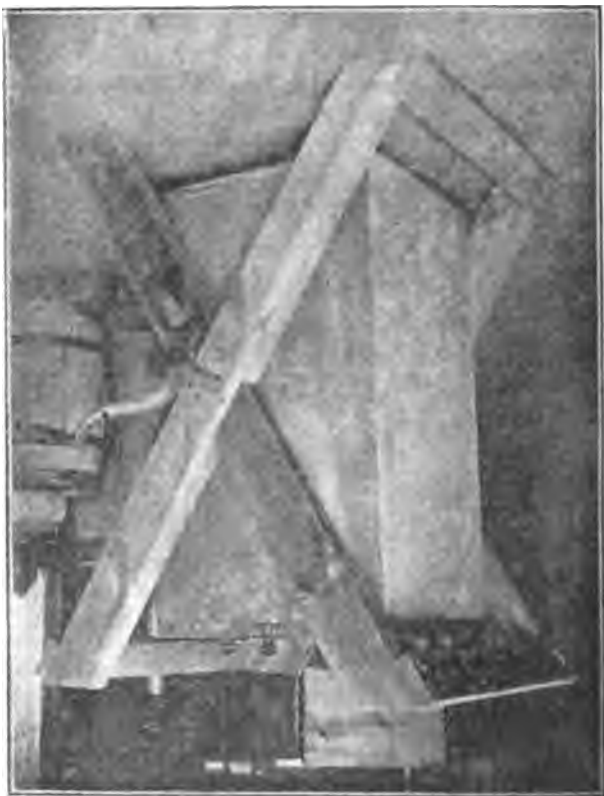
Powder Folder.

which a screw fastens it to the edge of the prescription counter. When not in use, it is swung back out of the way.—Proc. Pa. Phar. Assoc., 1903, 173.

Folded Powder Holder—A Convenient Device.—I. M. Weills gives a description of what he terms a "Happy Thought Folded Powder Holder," a device which is intended for the protection of folded powders during intervals when the dispenser is temporarily called away to attend to other duties. The details of construction are given in the author's paper, but cannot be conveniently condensed and are too voluminous to find place here.—Proc. Pa. Phar. Assoc., 1903, 186-187.

Powder Mixer—An Economical Contrivance.—H. F. Ruhl has constructed the powder mixer shown by Fig. 55, which he finds very useful

FIG. 55.

**Powder Mixer.**

when large quantities of powders are to be mixed, as in making cattle powder and the like. It may suffice here to state that it consists of an oblong wooden box, 18 inches square by 30 inches high, which is caused to revolve on iron axles extending from the center of its greatest length through the frame serving as a support. The height of the box, and its

shape, causes the powder to shift end to end as the mixer revolves, and will thus mix the powder thoroughly if the box is not revolved too rapidly. The box, with the exception of the lid, is nailed securely—the lid alone being fastened by screws for convenience in removal and readjustment.—*Proc. Pa. Phar. Assoc.*, 1903, 143.

Powder Mixer—Home-made and Inexpensive.—H. A. Brainon describes a powder mixer, suitable for condition powders and the like, which is shown in detail by suitable illustrations accompanying his paper, but must be consulted by those interested in the original. The author utilizes a keg which originally contained bicarbonate of soda, and succeeded, with an absolute outlay of only 30 cents for some necessary iron rods and thumb-nuts, in constructing an apparatus which has been efficiently in use for the intended purpose for a number of years.—*Amer. Drugg.*, 43, No. 9 (Nov. 9, 1903), 270.

Granular Effervescent Salts—Effective Manipulation.—Prof. E. Fullerton Cook recommends a practical method for preparing granular effervescent salts which contemplates the use of a basis in which the tartaric and citric acid and the sodium bicarbonate are in such proportions as to secure neutral sodium salts, while the relative proportions of the two acids are such, that the water of crystallization present in the citric acid shall be sufficient to produce a pasty mass when the mixture is heated to a temperature of about 200° F. The following mixture fulfills these conditions:

Basis for Effervescent Salts:

Sodium bicarbonate, dried and powdered.....	530 Gm.
Tartaric acid, dried and powdered.....	280 Gm.
Citric acid, uneffloresced crystals.....	180 Gm.

Powder the citric acid and add the tartaric acid and sodium bicarbonate.

This basis may be mixed with many of the medicaments commonly used in the form of granular effervescent salts, in the proportion which will properly represent their doses, and such substances as sodium phosphate, magnesium sulphate, citrated caffeine, potassium bromide, lithium citrate, potassium citrate, and others, will produce satisfactory products. A typical formula would be as follows:

Effervescent Sodium Phosphate:

Sodium phosphate, uneffloresced crystals	500 Gm.
Sodium bicarbonate, dried and powdered.....	477 Gm.
Tartaric acid, dried and powdered.....	252 Gm.
Citric acid, uneffloresced crystals	162 Gm.

Dry the sodium phosphate on a water-bath until it ceases to lose weight; after powdering the dried salt, mix it intimately with the citric acid and tartaric acid, then thoroughly incorporate the sodium bicarbonate. The mixed powders are now ready for granulation. The change in manipula-

tion which is suggested to replace that usually followed, requires either a gas stove or a blue-flame coal-oil stove, and one of the small tin or sheet-iron ovens which are so largely used with these stoves. The stove itself will be found in almost every drug store, and the oven costs but from one to two dollars. The oven is heated to about 200° F., and the previously mixed powders are placed on a glass plate, which has been heated with the oven—about half a pound being taken at a time, dependent upon the size of the oven. The door of the oven is now closed for about one minute, and when opened, the whole mass will be found to be uniformly moist and ready to pass through a suitable sieve, the best kind and size being a tinned iron No. 6. The moist granular powder may then be placed upon the top of the oven, where the heat is quite sufficient to thoroughly dry the granules, and the operator may proceed immediately with the next lot of mixed powder, easily granulating ten or more pounds within an hour. The use of sugar as an addition to these salts is deprecated by the author, on the ground that the slight improvement in taste, which is sometimes questioned, does not offset the likelihood of darkening, which is apt to occur when the salt is being heated, or the change in color after it has been made several months.—*Proc. Pa. Pharm. Assoc.*, 1903, 116–118.

Granular Effervescent Preparations—Practical Observations.—In the formulas of the B. P. for granular effervescent preparations, the essential components of a granulating basis are citric acid, tartaric acid, and sodium bicarbonate—the latter being employed in molecular proportion to the two acids, while the citric acid is used in addition to the tartaric acid in order that by the elimination of its water of crystallization—which is absent in tartaric acid—a mass of suitable consistence for granulation may be formed. The proportions in which these acids are directed in the official formulæ—embracing *sodii citro-tartras eff.*, *caffeinæ citras eff.*, *sodii phosph. eff.*, *sodii sulph. eff.*, *magnesii sulph. eff.*, and *lithiæ citras eff.*—are practically identical, being 1 of citric acid to 1.5 in the first four, 1 to 1.52 in the magnesium salt and 1 to 1.48 in the lithium compound. John Lothian, however, shows by his experiments, confirmed by his experience, that the proportions of these acids require to be varied considerably according to the nature and amount of the medicament. Thus, in the case of

Magnes. Sulph. Eff., where almost 40 per cent. of a partially exsiccated salt is contained in the finished product, equal proportions of the two acids give the best results. In the case of

Sodii Sulph. Eff., containing 25 per cent. of exsiccated salt, a good mass is obtained with 1 part of citric acid to 1.2 parts of tartaric acid; while in the case of

Sodii Citro-Tartras Eff., the proportion of tartaric acid has to be increased. Concerning the

Manipulation best adapted to the successful preparation of these salts, it has been claimed by Lunan and Davidson that the temperature directed to be used in the B. P. (93.3° to 104.4° C.) for the effectual granulation, is much too high, and they recommend that a temperature of 70° C. be employed for granulating and a temperature of 50° C. for drying. While agreeing with these authors that a temperature of approximately 100° C. is too high in many cases working with the B. P. formulæ, Mr. Lothian says that in practice this is the most convenient temperature at which to work, using on the small scale a water-bath, and on the large scale a steam-jacketed dish. The dish should be uniformly heated to this temperature before the mixture is transferred to it, and the granulation effected as quickly as possible. Granules prepared with a properly adjusted basis at this temperature— 100° C.—will effervesce better than those prepared at a lower temperature using the B. P. formulæ. Moreover, the granules can be dried at even a lower temperature than 50° C. in a drying cupboard provided with a good draught, as by using a well-adjusted basis there is no excessive quantity of moisture to be got rid of, and therefore the effervescing quality of the granules is not deteriorated in the drying process.—Pharm. Journ., April 30, 1904, 583.

Ferrum Oxydatum Saccharatum—*Formula of the Dutch Pharm.*—The following formula and process for preparing saccharated ferric oxide has been adopted and is given in the supplement to the Dutch Pharmacopœia: Ferric chloride solution (containing 15 per cent. of Fe.), 20, is mixed with simple syrup, 20, and water, 20; this is gradually added to a solution of sodium carbonate, 24, in water, 60, care being taken that the temperature of the mixture does not exceed 15° C. When the evolution of carbonic acid gas has ceased, sufficient caustic soda solution, about 14, is added to give a clear liquid; then sodium bicarbonate, 9, and boiling water, 600, are added. The precipitate thus obtained is collected on a cloth, washed free from chloride with boiling water, pressed, mixed with powdered sugar, 70, and dried on the water-bath.—Pharm. Post, 36 (1903), 583.

Asthma Powder—*Efficient Formulas.*—Sir James Sawyer has published two formulas for fuming inhalations which he has used with marked success in cases of bronchial asthma. One powder consists of potassium nitrate, 1 part; powdered anise fruit, 1 part; powdered stramonium leaves, 2 parts. The alternative formula contains less anise fruit, with the addition of small quantities of black tea, lobelia and oil of eucalyptus.—Pharm. Journ., Mar. 12, 1904, 366; from Midland Medical Journal, 33, 34.

Borated Talcum—*Formula.*—Milman Parry says that borated talcum has become a staple. It is as necessary to a baby's toilet as a sponge or a piece of castile soap. It has become indispensable as a toilet preparation for women, and it is one of the few toilet accessories finding favor with men. If a formula is wanted, try this:

Po. talcum	4¼ lb.
Po. boric acid.....	½ lb.
Po. starch	¼ lb.
Heliotropin.....	10 gr.
Coumarin	2 gr.
Vanillin	2 gr.
Alcohol.	1 fl. oz.

Dissolve the heliotropin, coumarin and vanillin in the alcohol, rub this well with the starch. Rub the perfumed starch a little at a time with the powdered talcum, then mix in the boric acid and sift once through a No. 80 sieve or finer, then twice through a No. 60 sieve. The talcum should be white, odorless and impalpable, otherwise the finished article will not be first-class. Do not try to use a boric acid that is not impalpable. A satisfactory

Violet Talcum is obtained by perfuming 5 lbs. of the powder with the following mixture—adapted from Prof. Scoville's formula for violet water (see Proceedings, 1902, 510)—instead of the perfume above recommended :

Ionone.	15 m.
Oil neroli.....	15 m.
Oil bitter almonds	1 drop.
Oil spearmint	2 drops.
Oil santal.....	30 m.
Heliotropin.	10 gr.
Tr. civet ..	10 m.
Tr. Benzoin.	30 m.
Ess. jasmin, from pomade	1 fl. oz.

To get good results from this combination the ingredients should be mixed and the solution kept from fifteen to thirty days before using, to allow the different odors to blend into one.—West. Drugg., Aug., 1903, 412.

Dusting Powder (Pulvis Zinci Oxidi Compositum—Formula.—The following formula for a dusting powder is given in the Pharmacopœia of the German Hospital, Philadelphia: Zinc oxide, talcum, boric acid, of each equal parts.—West. Drugg., October 1903, 542.

Headache Powders—Formula.—John Culley recommends the following formula for preparing headache powders, which are preferably dispensed in form of cachets or may also be enclosed in gelatin capsules :

Citrated caffeine.....	2¼ oz.
Powd. acetanilid.....	11¼ oz.
Camphor monobromated.....	9 dr.
Aromatic powder.....	2¼ oz.
Sodium bicarbonate	6¾ oz.
Powd. guarana.....	9 oz.

Mix and divide into doses weighing 10 grains each.—Merck's Rep., Feb. 1904, 39.

Nail Powder—Efficient Formula.—Julian L. Waller says there are many nail powders on the market, but none have more than French chalk and a little powdered silica added with a little coloring matter, whereas the main article should be white wax. He recommends the following formula : White wax, 8 ozs. ; alcohol, 8 fl. ozs. ; eosine, 6 grains ; French chalk, 32 ozs. ; electro-silicon, 24 boxes. Melt the wax, heat 7 fl. ozs. of the alcohol and pour slowly into the heated wax. Into a large Wedgewood mortar put 12 boxes of electro-silicon and gradually pour the mixture of alcohol and wax upon it, rubbing continually ; then gradually add the balance of the electro-silicon and the French chalk. Dissolve the eosine in 1 fl. oz. of the alcohol and add this solution to the powder ; then sift, first through a No. 40 sieve, and finally through a No. 60 sieve or bolting cloth.—Merck's Rep., Aug., 1903, 217.

RESINÆ.

Podophyllin—Character and Yield by Different Methods.—A. R. L. Dohme and E. F. Kelly communicate the results of some experiments which were prompted by some statements in H. J. Lohmann's paper on the resin of podophyllum communicated to the Association at Mackinac (see Proceedings, 1903, 317-319), which seemed to be open to controversy. The authors repeated the experiments made by Mr. Lohmann, using mandrake root, such as is obtained by the carload from North Carolina, percolating it by the U. S. P. method, and following exactly the details of the three methods of precipitation given by Mr. Lohmann, as indicated in the following table, in which the results are exhibited along with those obtained by Mr. Lohmann for comparison :

	Lohmann.	Dohme and Kelly.	Color of product.
Method I., alcoholic extract poured into water.....	4 per cent.	5 per cent.	Grayish-white,
Method II., alcoholic extract poured into acidulated water.....	9 per cent.	5.5 per cent.	Light-brown.
Method III., alcoholic extract poured into acidulated water+5 per cent. of alum.	15 per cent.	4.9 per cent.	Greenish-yellow.

The Product from Method I. contained 0.45 per cent. of matter insoluble in alcohol ; 0.18 per cent. of ash ; was soluble to the amount of 66 per cent. in chloroform, and 68.5 per cent. in ether, and contained 30.2 per cent. of *podophyllotoxin*.

The product from method II was completely soluble in alcohol, yielded no ash, was soluble to the extent of 59 per cent. in chloroform and 64.2 per cent. in ether, and yielded 30.0 per cent. *podophyllotoxin*. The product from method III contained 0.475 per cent. of matter insoluble

in alcohol, yielded 0.3 per cent. of ash, was soluble to the extent of 68 per cent. in chloroform and 74.5 per cent. in ether, and yielded 28.2 per cent. of podophyllotoxin.

These results show very conclusively that the products obtained by the different methods are essentially the same, both as regards quantity and quality. The authors cannot account for the great variations in the yield of resin experienced by Mr. Lohmann by methods differing but slightly in principle; nor have they found that season or age affected the yield of podophyllin from any mandrake; while, is so far as Mr. Lohmann's caution to "beware of yellow podophyllin" is concerned, they are rather inclined to caution against the acceptance of any podophyllin other than such as is cream-colored or yellow. The authors, furthermore, mention that the physiological value of podophyllin is far more accurately estimated by determining the amount of podophyllotoxin it contains, than by trying it on human beings, and they promise, in a future communication to describe a method which they have found reliable.—*Drugg. Circ.*, 47, No. 12 (Dec., 1903), 251.

SAPONES.

Sapo Mollis and Sapo Durus—Pharmacopœial Formulas Suggested.—In consequence of the unsatisfactory and varying quality of the commercial soft and hard soaps required for B. P. purposes, John Lothian suggests the adoption of formulas for their preparation and recommends the following, partly taken from the "*Pharm. Helv.*," as satisfactory:

Sapo Mollis:

Olive oil.....	100 parts.
Solid potassium hydroxide.....	21 parts.
Water.....	100 parts.
Alcohol (90 per cent.).....	20 parts.

Boil by means of a steam bath until the oil is saponified, adding if necessary a little more spirit to assist the saponification. The resulting scap is approximately neutral.

Sapo Durus:

Olive oil.....	100 parts.
Soda lye, sp. gr. 1.33.....	50 parts.
Alcohol (90 per cent.).....	30 parts.

Heat on a steam bath until saponification is complete. The soap which is formed is dissolved in 300 parts of hot distilled water. The soap is salted out of this solution by adding a filtered solution of 25 parts sodium chloride, and 5 parts crystallized sodium carbonate in 80 parts of water.—*Pharm. Journ.*, April 30, 1904, 584.

Neutral Potash Soap—Preparation.—Referring to Beringer's formula

for neutral potash soap, Beysen points out that in practice it is found necessary to use an excess of KOH, and that it therefore becomes necessary to neutralize this excess if a really neutral potash soap is desired. The quantity of acid necessary for this purpose is easily estimated in an aliquot sample, adding volumetric acid until the red color of previously added phenolphthalein disappears.—Pharm. Ztg., 49, No. 12 (Febr. 10, 1904), 126.

Potash Soap—Importance of its Addition to Disinfecting Media.—Dr. Otto Heiler observes that, although it has been determined that potash soap (*Sapo kalinus*, G. P.) has but little disinfecting power, the addition of this soap, which should contain no free alkali, but generally does, notably increases the disinfecting power of carbolic acid. With crystalline carbolic acid in the proportion of 1 : 3, at ordinary temperature, and without any other addition whatever, it makes a perfect solution, but the increase in disinfecting power is greatest when the mixture is in equal parts. While to destroy typhus bacillus, for instance, required 20 minutes' exposure to pure carbolic acid (5 per cent.) solution, they were destroyed in the same length of time by a 4 per cent. solution with equal parts of potash soap. The same result is obtained with less than half of that amount when crystalline carbolic acid was used. If these experiments with phenol and soap be repeated on the insoluble (in water) cresols, the result is reached that the use of potash soap in the preparation of disinfectants containing cresols not merely makes possible the solution of the cresols in water in a degree of concentration suitable for disinfectants, but the disinfecting power of a cresol-soap solution is notably increased by the soap. Either this increase is to be referred to the fact that this comparatively ineffective soap, *per se*, renders the objects to be disinfected more readily affected or influenced by the cresols, or that a new and complicated substance is produced by the union of the phenols, cresols and soap, possessing a higher index of disinfection—or, finally, the solution of the disinfectant acquires through the addition of the soap an increment of its power of dissociation (*i. e.*, a more ready decomposability) along with a higher degree of efficiency. The questions arising from this investigation are being prosecuted further by the author.—Nat. Drugg., Nov., 1903, 321; from "Archiv für Hygiene."

SPIRITUS.

Spirit of Carbolic Acid—A Desirable Pharmacopœial Preparation.—C. S. N. Hallberg says that while liquefied carbolic acid is an indispensable convenience, its admission to the U. S. P. is fraught with danger, owing to the confusion that would arise in its title. The abbreviation "Liq." surely to be employed, is bound to be interpreted as meaning "solution," which, though not official, is commonly recognized as the five per cent. solution of carbolic acid in water. While the dispensing of this "solu-

tion" for the liquefied acid would not prove harmful, the contrary procedure of dispensing the liquefied, when the solution (5 per cent.) would be ordered under the abbreviation "Liq.," would be dangerous. A dilute solution is desirable, and this could be best secured by admitting an entirely new preparation, such as

SPIRITUS ACIDI CARBOLICI.

Carbolic acid, domestic.

Carbolic acid.....Gm. 250, or 4 oz. av. 75 grs.

Alcohol to.....Cc. 1,000, 16 fl. oz.

The chief value of this acid would be its comparative innocuousness.—West. Drugg., March, 1904, 128.

Spiritus Cochleariæ, Ph. G.—Preparation from the Seed.—Having determined that the volatile oil obtained from the seeds of *Cochlearia officinalis* is identical with that of the fresh or dried herb (see Oil of *Cochlearia officinalis*) under "Organic Chemistry," Urban proposes the seed for the preparation of *Spiritus cochleariæ* Ph. G., not only because it is more economical, but also because the seed is characterized by greater stability and compacter volume. The formula would be as follows: 200 Gm. cochlearia seed; 50 Gm. white mustard seed; 3 Kgm. water; 1.125 Kgm. alcohol, 90 per cent. Distill and collect 1.5 Kgm.—Arch. d. Phar., 241, No. 9 (Dec. 15, 1903), 693.

Spirit of Nitrous Ether—Stability when Properly Preserved.—G. E. Shaw records the results of experiments made with spirit of nitrous ether, which prove that when it is preserved under proper conditions it may be kept for a long time without undergoing serious change. A quantity of the spirit, assaying 7.02 volumes of nitric oxide, was transferred into a dozen 4-oz. Lilborne flasks which were nearly full, sealed immediately and kept dark in a box at the ordinary laboratory temperature. A flask was broken open at intervals covering over three and a half years, the first one assaying 6.9 volumes and the last one broken open, 6.43 volumes of nitric oxide. On the other hand, a lot of the spirit preserved in flasks part filled and exposed to diffused daylight and to the full light of a window, fell within the short period of 14 days from 7.08 volumes to 5.54 when half full, and 4.58 volumes when one-sixth full, in diffused daylight, and to 0.16 when half full, and 0.04 volumes of nitric oxide when exposed to direct light. It is clear that the spirit can be properly preserved only in nearly full, sealed flasks and in the dark, and cannot be relied on after it has been opened a few days and exposed to light.—Pharm. Journ., Aug. 8, 1903, 236.

Spirit of Nitrous Ether—Selection of Suitable Diluents in Prescribing.—In a paper on spirit of nitrous ether, Frank Holman, after discussing its composition and keeping qualities, and showing the unsatisfactory character of the product commonly dispensed, recalls some interesting com-

munications made upon the same subject about the middle of the last century (before 1860 and after) by the late Dr. Edward R. Squibb, in which he had shown that properly prepared spirit of nitrous ether, kept in small, well-closed bottles, will keep practically unchanged for a long time, but that when dispensed it will rapidly undergo a change, particularly if in admixture with certain diluents. The kind of unsuitable diluents and the rapidity of the changes are shown in a table originally published by Dr. Squibb, which, being not generally available now, may be usefully reproduced here, as given in a condensed form by Mr. Holman :

Equal measures of Spirit of Nitre with the following vehicle.	Nitrometer Indication.					
	Original Strength in Ethyl Nitrate.	When freshly Mixed.	After 24 hours.	After 48 hours.	After 72 hours.	After 96 hours.
Water	5 p. c.	3.00	1.77	1.30	.83	.66
Water	5 p. c.	3.30	2.20	1.30		
Glycerin and water, equal parts	5 p. c.	4.2	3.15	2.57	2.96	1.65
Glycerin and water, equal parts	5 p. c.	4.3	4.2	3.4		
Simple syrup and water, equal parts	5 p. c.	4.20	4.89	3.54	3.36	3.15
Simple syrup	5 p. c.	3.10	3.94	3.42	2.30	3.00
						2.40

While it is shown in the table that changes occur in all cases, the use of syrup seems to be the least objectionable. As advised by Dr. Squibb, a sufficient supply for three days or so, and diluted with simple syrup, would be the best, and this should be recalled to the attention of the prescriber by the pharmacist.—*Can. Pharm. Journ.*, Aug., 1903, 20-22.

Bay Rum—Source and Method of Production.—The “West Indian Bulletin” contains an account of the bay oil and bay rum industries in the West Indies, about which little information appears to have been published. The island of Dominica is one of the principal centres of the industry, and the business has proved a lucrative one. It was not known until late years from what plant bay rum was prepared, but it is now ascertained that the tree is

Pimenta Acris, one of the plants known in Jamaica as wild cinnamon. Bay rum is manufactured in a very simple manner by distillation. The leaves are picked from the trees and then dried; in this state they are placed in the still, which is then filled with water, and the process of dis-

tillation is carried on. The vapor is then condensed in the usual way, and forms "bay oil," a very small quantity of which is required for each puncheon of rum—say $1\frac{1}{2}$ pints of pure oil to a puncheon of rum. St. Thomas (Danish West Indies) is the headquarters of the bay rum industry, and the alcohol used is white rum from the Danish island of Santa Cruz. The supply of bay-leaves required at St. Thomas is obtained from St. John's, Dominica, and the Virgin Islands. But when Porto Rico became attached to the United States large quantities of leaves were obtained from that island, and, being free of import duty, crowded the Dominican product out of the market. It is, however, asserted that the Porto Rico leaves are inferior to those obtained in Dominica, and it is expected the bay-leaf trade, which according to a letter written by Mr. H. Hesketh Bell, administrator of Dominica, has materially decreased in recent years, will probably soon resume its former proportions, the best variety of bay tree being fairly common in Dominica. It is probable that the true bay tree (*Pimenta acris*) may be found in Porto Rico, but as the leaves of all the trees met with have "the taste and odor of lemon," they are said to be useless for the preparation of the best qualities of bay oil, and therefore also of bay rum.—Chem. and Drugg., Jan. 30, 1904, 188.

SUCCI.

Lemon Juice—Industrial Production.—Hensel and Prinke give some information concerning the industrial production of lemon juice. The crude juice is produced in Messina, by depriving the fruits first of the peel and the seeds, then cutting them into slices, and expressing them—all this being accomplished by machinery specially adapted for the purpose. The turbid juice is then preserved (? Rep.) and forwarded in glass or wood to the German factory, where it is clarified without resort to chemicals. Pure lemon juice, when properly prepared from sound fruits and preserved, should contain not less than 5.2 nor over 7.6 per cent. of citric acid. 100 Gm., mixed with 16 Gm. of ammonia water, should assume a perfect red-brown color, due to the natural constituents of the fruit, and when the same quantity is superimposed by 40 Gm. of alcohol, a white zone, due to pectin and albumin substances, should be developed. Its natural color should be deep greenish-yellow, darkening by age, but should never be colorless or light-yellow. Syrup made by boiling 40 Kgm. of this juice with 60 Kgm. of refined sugar (free from blue) will keep, and retain its agreeable taste for years.—Pharm. Ztg., 49, No. 7 (Jan. 23, 1904), 68.

SUPPOSITORIA.

Copraol—A New Suppository Basis.—A writer in Pharm. Ztg. calls attention to "Copraol," a purified product obtained from the oil of copra nuts and introduced several years ago by Paul M. Bromigk, and recommends it highly as a substitute for cacao butter as a basis for rectal and

vaginal suppositories. In its external character it resembles cacao butter, but it is odorless and tasteless, and has a somewhat higher melting-point. Its particular advantages over cacao fat are the contractability on the cooling of the melted fat, facilitating the removal of the suppositories from the moulds; the rapidity with which it congeals, permitting its use except during the hottest summer months without ice refrigeration; and its ability to take up large quantities of watery fluids (up to 50 per cent). With the exception of tannin, all water-soluble substances may be incorporated with melted copraol by shaking, and then immediately moulding.—Pharm. Ztg., 48, No. 80 (Oct. 7, 1903), 816.

Glycerin Suppositories, B. P.—Modification of Process.—In order to simplify the process and prevent the necessity of evaporation in making glycerin suppositories, John Lothian recommends the following simplification, in which the quantity of water is reduced, so as to secure the result contemplated by the official formula: Distilled water, 2 parts; gelatin, 1 part; glycerin, 5 parts. Dissolve the gelatin in the water on a water-bath, warm the glycerin to the same temperature, add and mix.—Pharm. Journ., April 30, 1904, 583.

SYRUPI.

Syrups—Preparation from Fluid Extracts.—The persistent agitation in the pharmaceutical literature during many years to prepare medicinal syrups by the simple admixture of fluid extracts and sugar syrup on the ground of convenience and economy, has induced the Swiss Pharmacopœia Commission to take the subject into serious consideration, with the view to the possible adoption of the method in the contemplated revision (IV) of the Pharm. Helv. III., in consequence of which the sub-committee on galenical preparations has submitted a report which in the main appears to be favorable to the contemplated change if the conditions outlined can be fulfilled. It is submitted that a fluid extract suitable for this purpose must in essentials respond to the following requirements:

1. It must contain undiminished all the therapeutically active constituents of the drug.
2. It must be completely soluble in water, since a permanently clear syrup can only be obtained with a water-soluble extract.
3. The fluid extracts must possess sufficient stability to remain unchanged for several months, at least, without the necessity of sterilizing them and preserving them in very small, completely filled, and hermetically sealed vials—the only preservatives admissible being alcohol and glycerin.
4. For the preparation of these fluid extracts two typical methods are recommended:
 - a. The aqueous extraction is concentrated by evaporation to the required volume and preserved by the addition of glycerin.
 - b. From vegetable drugs containing volatile substances, the extraction

is effected by percolation with very weak alcohol—not stronger than 15 per cent.—and (after setting the first portions aside, Rep.) evaporating only the exhaust percolate after adding the glycerin necessary for the preservation of the fluid extract.

Modifications of these two types (and modifications become necessary in the case of some drugs, as is apparent from the following formulas proposed by the sub-committee) are :

Extr. Adianti (Fluid).—An aqueous infusion from 10 parts of fol. adianti is evaporated to 4 parts and mixed with 4 parts of aq. aurant and 2 parts of glycerin. Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Cinnamomi (Fluid).—Cort. cinnamon chin., 50 parts, is percolated with 15 per cent. alcohol, 40 parts of percolate being reserved, and the exhaust percolate, evaporated to 10 parts after the addition of 5 parts of glycerin, is added to the reserve. Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Ipecacuanh. (Fluid).—Rad. Ipecac, 10 Gm.; glycerin, 25 Gm.; acid. mur. dil., $\frac{1}{2}$ tt 5; aqua, 200 Gm., are digested in the water-bath half an hour and filtered. The filter is washed with hot water to 250 Gm. of clear filtrate, which is evaporated in the water-bath to 100 Gm. Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Liquirit. (Fluid).—This is the aqueous preparation of the Phar. Helv. III. purified by alcohol. Of this extract 2 parts are to be mixed with 8 parts of simple syrup.

Extr. Menth. pip. (Fluid) is obtained from fol. menth., like *Extr. Cinnam.* (see above). Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Ratanhie (Fluid).—Ext. ratanh. (Phar. Helv. III.), 20 parts; hot water, 200 parts; glycerin, 40 parts; spir. dil., 20 parts. The extract is dissolved in the hot water, the filtered solution evaporated to 40 parts and the glycerin added, followed, when cold, by the diluted alcohol. Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Rhei (Fluid).—5 parts of rhiz. rhei cut into thin slices, 0.3 parts of natr. carb., 5 parts of glycerin, and 1 part of cort. cinnam. chin., are macerated 12 hours with 100 parts of water; then digested on a water-bath, half an hour, and strained without pressure. The strained liquid (85 parts) thus obtained, after standing 12 hours is filtered and the filtrate evaporated to 10 parts. The *syrup* is prepared from this extract by mixing 1 part with 9 parts of simple syrup; the *tinct. rhei aquosa*, by mixing together 2 parts of this extract, 0.5 parts of alcohol, and 7.5 parts of water.

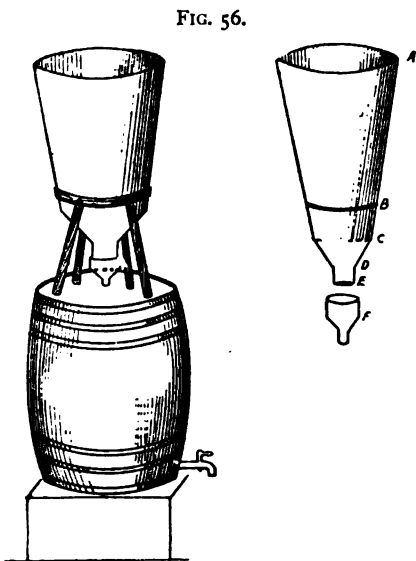
Extr. Rosæ (Fluid), is prepared from flor. rosæ like extr. cinnam. (see above). From this extract the *Mel. rosatum* is prepared by mixing 1 part with 9 parts of *Mel. depuratum*.

Extr. Sarsaparillæ (Fluid)—The percolate obtained according to the Pharm. Helv., iii., is evaporated after the addition of glycerin to the weight of the sarsaparilla employed. Of this extract 1 part is to be mixed with 9 parts of simple syrup.

Extr. Senegæ (Fluid).—This is prepared by macerating rad. senegæ for 12 hours in a percolator, and then percolating to exhaustion with 15 per cent. alcohol. The percolate is evaporated and glycerin is added.

Extr. Turion. Pini (Fluid) is prepared from turio pini like extr. cinnamomi.—Schw. Wochenschr. f. Ch. u. Phar., July 4, 1903, 313.

Syrups—Convenient Percolator.—"Colatus" describes a convenient percolator for preparing syrups for the soda fountains, which is shown by Fig. 56. The percolator, of galvanized iron or tinned copper, measures 22 inches from *A* to *C* in the diagram, 6 inches from *C* to *D*, and 2 inches from *D* to *E*. The diameter at *A* is 15 inches, at *C* 9 inches and at *D* 3 inches. The funnel, *F*, is about $\frac{1}{4}$ inch wider in diameter than the percolator at *E*, so as to make the percolator fit into it. A piece of perforated tin to form a sieve is soldered on the bottom at *E*, while at *C* is a removable diaphragm of perforated tin, braced by two heavy wires soldered across.



Percolator.

This diaphragm prevents the sugar from filling the narrow portion of the percolator, where it might retard the passage of the heavy syrup. A crease in the percolator at *B* just above the stand or stool-like support prevents the percolator from sinking too far into the funnel. This stand should be made of heavy band-iron. To operate, tie a piece of flannel over the bottom at *E*, put the diaphragm in place at *C*, then fill to within 2 or 3 inches of the top with granulated sugar, and put in place on the barrel and pour on 3 or 4 gallons of water. There should be an extra hole in the top of the branch for a measuring rod, and this hole should be kept corked, the space between the percolator and funnel being filled with absorbent cotton to prevent dirt getting into the branch.—Amer. Drugg., 43, No. 2 (July 27, 1903), 31.

Official Syrups—Practical Observations.—Paul Caldwell recommends

magnesium carbonate as superior in all cases in which precipitated calcium phosphate is now directed as a clarifying agent. He makes

Syrup of Iodide of Iron by following the U. S. P. directions up to the point where it directs that the solution of iron iodide be heated to boiling. Instead of heating, three drams of reduced iron are introduced (in making the official quantity, Rep.), whereupon a complete reaction takes place.

Aromatic Syrup of Rhubarb is obtained permanently clear if a small quantity (? Rep.) of potassium carbonate is added to the tincture.

Syrup of Tolu is preferably made by the formula given in a foot-note in the U. S. Dispensatory, 1870.

Syrup of Wild-Cherry is best made by using all the glycerin specified in the formula for macerating the wild-cherry bark, together with just enough water to cover the surface of the drug. This mixture extracts more of the coloring matter of the drug.—So. Drug. Journ., Dec., 1903, 186.

Syrups—Improved Formulas.—George A. Mathews makes some practical suggestions concerning the preparation of simple syrup, and gives improved formulas for several medicinal syrups. With reference to

Simple Syrup, he observes that when this is prepared by the U. S. P. formula, with heat, it does not keep well, while when prepared by the cold process, of percolation, it will keep indefinitely. He suggests the use of a sponge, well washed and squeezed out, as the most convenient and practical filter medium for this purpose, and gives detailed directions which may, if necessary, be consulted in the original paper. To produce a perfect preparation of

Aromatic Syrup of Rhubarb, he recommends the following formula and process :

Aromatic fluid extract of rhubarb	3 ounces.
Distilled water, enough to make	2 pints.
Carbonate of magnesium	4 drams.

Mix and let stand about 12 hours, occasionally agitating, and filter, adding distilled water through the filter to make filtrate measure 1 pint. Now proceed as in the formula for simple syrup, placing the dampened sponge in the percolator neck. Put in granulated sugar $3\frac{1}{2}$ pounds. Pour on the filtrate and return the first half pint to percolator, adding distilled water to bring up to one-half gallon. The product is an elegant syrup, which does not become cloudy on standing. Another good formula is the following for

Syrup of Licorice.—The essences of coriander and caraway, it should be stated, are made in the proportion of one-half dram to the ounce :

Powdered extract of licorice.....	$\frac{3}{4}$ viii.
Glycerin	$\frac{3}{4}$ xvi.
White sugar.....	$\frac{3}{4}$ xxiv.
Ammonia water.....	$\frac{3}{4}$ iv.
Distilled water, enough to make.....	Oiv.

In a mortar of convenient capacity rub the extract of licorice with the glycerin and 1 pint of distilled water. Add the ammonia, pour into an evaporating dish and place on a stove over a slow fire until the fumes of ammonia are driven off. Now add the sugar and bring to a boil, remove from fire and strain while hot. When cold add flavor as follows :

Ess. anise,	
Ess. caraway,	
Ess. wintergreen,	
Ess. coriander	3 ss.

The author also gives the following formula for

Syrup of Myrrh, which may be made by the official process for syrup of tolu :

Gum myrrh.....	10
Calc. phosph. precip.....	50
Alcohol.....	50
Sugar.....	850
Water, q. s.....	1000

—Pharm. Era, July 16, 1903, 59.

Syrup of Calcium Lactophosphate—Improved Process of Manipulation.—

In a previous paper (see Proceedings, 1902, 761), Chas. H. LaWall recommended a process for preparing Easton's Syrup, in which the difficulties attending the preservation of this syrup were obviated by so modifying the formula that the finishing was accomplished by the simple admixture of a concentrated stable solution of the medicinal ingredients with simple syrup. Experiments since made with the official syrup of calcium lactophosphate have shown that a similar expedient is possible in this case. Following the official directions as to quantities, 25 Gm. of calcium carbonate are gradually added to 60 Cc. of the lactic acid, previously diluted with 100 Cc. of water. When solution has been effected, the dish containing it is gently warmed on a water-bath, and 36 Cc. of phosphoric acid added under constant stirring. A limpid colorless solution is thus produced, which is diluted with water to 250 Cc., and filtered. This solution is perfectly stable, and serves for the preparation of the official syrup by adding 25 Cc. of orange-flower water and 725 Cc. of syrup.—Proc. Pa. Pharm. Assoc., 1903, 166-167.

Easton's Syrup—Another Modification.—Geo. E. Perry suggests the preparation of Easton's syrup from two solutions prepared as follows :

SOLUTION NO. 1.

Iron, in wire	150 grains.
Concentrated phosphoric acid.....	2½ fl. oz.
Distilled water.....	2¼ fl. oz.

Place in flask and apply gentle heat till the iron is dissolved. Cool, make up to 5 fl. oz., and filter.

SOLUTION NO. 2.

Strychnine, in powder	10 grains.
Quinine sulphate	260 grains.
Syrup	28 fl. oz.
Concentrated phosphoric acid	2 fl. dr.
Distilled water, to	35 fl. oz.

Rub the strychnine in a glass mortar with a little of the water, add the acid and triturate till solution is effected. Transfer to half-pint glass measure, add more water, then the quinine, and stir till dissolved. Make up with water to 7 fl. oz., and pour into the syrup. To this add chloroform, m xx. ; S. V. R., m xl. (mixed). Shake well, and finally filter through coarse paper. One of the iron solution and seven of this solution make Easton's syrup.—Pharm. Journ., Apr. 2, 1904, 469.

Fruit Syrups—General Method of Preparation.—Frederic E. Niece recommends the following method for the preparation of such fruit syrups as raspberry, strawberry, blackberry and pineapple: The fruit is first thoroughly cleaned, then washed with warm water, cut, then reduced to a pulp by mashing under pressure in a large mortar. This pulp is placed in a spacious vessel and allowed to remain exposed in a warm place until it has completely undergone fermentation, being occasionally stirred to assist the process. The pulp thus obtained is placed in a folded cheesecloth, allowed to drain, then expressed by pressure. To each quart of this juice add about a half ounce of pure, skimmed milk; allow to stand 24 hours, occasionally stirring it. After this it is gently warmed and passed through a double-pleated filter (first moistened with water) and returned several times until it comes through clear, using talcum if necessary. To each pound of the clarified juice add from 4 to 5 pounds of the best granulated sugar, using heat (carefully applied) to dissolve it, assisted by frequent stirring and removal of the scum as formed. Finally strain the finished product through a muslin strainer. While still hot place the syrup in clean jugs, completely filling them to the top in order to expel all traces of air; cork well and seal with paraffin.—Proc. Pa. Pharm. Assoc., 1903, 196.

Syrup of Raspberry—Deepening of the Natural Color.—According to the "Konserven Zeitung" (1903, 428), a dark-colored raspberry syrup may be obtained by a simple modification of the ordinary method of preparing it. This consists in adding sugar in layers to the crushed raspberries while they ferment. The ethyl alcohol which forms during this fermentation increases the amount of coloring matter which goes into solution. The syrup should not be boiled over the free fire, but should be heated by means of superheated steam, in order to avoid the formation of caramel. Moreover, the sugar used should be perfectly free from

ultramarine blue and from lime, as both of these impurities affect the color of this syrup.—*Amer. Drugg.*, 44, No. 3 (Feb. 8, 1903), 74.

Syrup of Ferrous Iodide—Manipulation.—H. A. B. Dunning recommends the following manipulation as being best adapted to the satisfactory preparation of syrup of ferrous iodide: Following the process of the Pharmacopœia, iron wine is placed in a suitable flask, with the iodine and water. After adding about two ounces of sugar (for 1000 Gm. finished syrup), the mixture is set aside until reaction has taken place and contents of flask are cooled, then heated nearly to boiling and allowed to set again for fifteen or twenty minutes. The mixture is then heated to boiling and filtered through a double filter into the syrup in the regular way. To each 1000 Gm. of finished syrup 4 Cc. sol. hypophosph. acid, 50 p. c., are added, then poured into amber stock bottles. The ferrous iodide solution is heated twice and allowed to stand because it has been observed, that if only heated once, as directed by the Pharmacopœia, often a yellowish-brown solution will filter through into the syrup (particularly when the sugar has been used to prevent oxidation) instead of the beautiful green ferrous iodide solution. The extra heating causes the disappearance of the yellowish-brown coloration, unlike that produced by an excess of iodine. Possibly some oxide, or oxyiodide of iron is formed and brought into solution. Hypophosphorous acid is added, so that any iodine liberated subsequent to completion of syrup will cause the acid's indirect oxidation to phosphoric acid, thereby causing the discoloration of the iodide. The syrup is recommended to be kept in dark bottles when hypophosphorous acid is present, because of its ready oxidation when exposed to light.—*Proc. Md. Pharm. Assoc.*, 1903, 22.

Syrup of Ferrous Iodide—Inefficiency of Dextrose as a Preservative.—In view of the confusion existing with regard to the value of glucose as a preservative of syrup of ferrous iodide, Daniel Base has made a number of experiments, using pure dextrose of tested quality, with results that lead him to the conclusion that pure dextrose, in various proportions, has no preserving power on syrup of ferrous iodide, and that in those instances described in the literature in which the syrup was apparently preserved by addition of glucose, it was due to foreign bodies and not to dextrose itself. Moreover, the only kind of dextrose or glucose that could be used without imparting color to the preparations, is the commercial syrupy glucose, which contains sulphite and is colorless. Commercial solid glucose is colored, and even C. P. dextrose of Merck and Eimer & Amend gives solutions somewhat colored. Absolutely pure dextrose, of course, is out of the question because of the cost. If it is true that pure dextrose has no preserving power, there is no object in using syrupy glucose of commerce, since the simpler and unobjectionable addition of hypophosphorous acid will accomplish the same result as the foreign substances in glucose.—*Proc. Md. Pharm. Assoc.*, 1903, 55-61.

Syrup of Ferrous Iodide—Restoration When Discolored.—W. F. Horn, in reply to a query, states that the official process for preparing syrup of ferrous iodide, if strictly and carefully adhered to, will give good results, but that it admits of some improvement in the details of manipulation. Concerning the restoration of the syrup when it has become discolored, he favors the method of boiling the syrup, and opposes the practice of exposing it to light. Exposure to light is always accompanied by the formation of free acid, which increases in proportion to the length of time and in the degree of exposure. The discoloration of the official syrup is largely due to free iodine held in solution by FeI_2 , and simple boiling of the syrup for a few minutes will restore it to its original color. He, therefore, advises that the syrup should, under no conditions, be exposed to light more than is absolutely necessary. The use of hyposulphites or sulphites he considers entirely unnecessary.—*Proc. Pa. Pharm. Assoc.*, 1903, 111–112.

Syrupus Galegæ—Formula.—Geo. M. Beringer suggests the preparation of a syrup of goat's rue from the fluid extract (also proposed by him, which see under "Fluid Extracts"), as follows :

Fluid extract of goat's rue.....	15 Cc.
Syrup	105 Cc.
Oil of fennel seed.....	1 Cc.
Mix.	

The tops, including stems and leaves, of goat's rue (*Galega officinalis*, L.) have long had the reputation, and have in recent years been demonstrated to possess valuable galactagogue properties.—*Amer. Journ. Pharm.*, 76, No. 6 (June, 1904), 283.

Syrup of Hydriodic Acid—Manipulation.—Luin B. Switzer, believing that the failure to produce a satisfactory syrup of hydriodic acid is largely due to the method of manipulating the ingredients, offers the following process, which deviates from the U. S. P. formula in the quantity of its components so as to insure a full assay of one per cent. of HI, or a little over :

Potassium iodide.....	18 grams.
Potassium hypophosphite.....	1½ grams.
Tartaric acid, crystallized.....	17 grams.

Dissolve the potassium salts in 22 Cc. of water, pour the solution into a vial, and place on ice or in ice water. Then put the tartaric acid crystals in a flask, add 17 Cc. of water, and dissolve by the aid of heat, being careful not to use too much heat, which causes evaporation of water. Allow to cool, then measure, and add an equal quantity of alcohol. Pour the tartaric acid solution into a vial, and cool on ice. After both solutions are cold, mix them together and stand in ice water for one hour, occasion-

ally shaking. Then filter, using a small white filter-paper. Wash the precipitate with cold, diluted alcohol until 340 Cc. are obtained; evaporate the solution on a water-bath to 170 Cc., and add water to make up the original quantity of 340 Cc. and cool; in the liquid then dissolve 600 grams of sugar, and add enough water to make 1000 Cc. Filter through white filter-paper and keep the syrup in dark bottles in a cool place.—*Drugg. Circ.*, 47, No. 11 (Nov., 1903), 229; from *Proc. Conn. Pharm. Assoc.*, 1903.

Syrup Hydriodic Acid—Improved Process.—A. B. Rains recommends the following formula for preparing syrup of hydriodic acid, for which he claims greater stability than when made by the official method, and at the same time avoids the use of alcohol. Dissolve 54 Gm. of potassium iodide and 4 Gm. of potassium hypophosphite in 64 Cc. of distilled water, and 56 Gm. of tartaric acid (in crystals), in 84 Cc. of distilled water. Heat both solutions to boiling and mix by pouring the solution of the salts into the acid solution. Set aside for an hour, then chill to 36° F., with shaved ice and maintain this temperature for about two hours. Filter through a pellet of absorbent cotton, and wash the residual bitartrate with ice-cold distilled water until 350 Cc. of filtrate, which mix with 9 times its volume of simple syrup.—*Proc. Tenn. State Drugg. Assoc.*, 1903, 45, 46.

Syrup of Hydriodic Acid—Improved Formula.—George L. Holstein submits the following formula, which he says he has used for a number of years in the preparation of syrup of hydriodic acid. In strength the syrup made by this formula answers to the U. S. P. requirements, while for color and keeping qualities it is a very satisfactory preparation.

Potassium iodide.....	13 Gm.
Tartaric acid.....	12 Gm.
Sugar.....	500 Gm.
Diluted alcohol.....	50 Cc.
Glycerin	150 Cc.
Distilled water, sufficient to make.....	1000 Gm.

Dissolve the potassium iodide in 15 Cc. cold distilled water, and the tartaric acid in 25 Cc. diluted alcohol; mix the two solutions in a flask and place it in ice water for half an hour, occasionally shaking. Filter the mixture through a small rapidly-acting white filter, and carefully wash the flask and filter with the remainder of the diluted alcohol, using small portions at a time, until no cloudiness is noticed upon applying the U. S. P. test (allowing a drop or two to fall into silver nitrate test solution); run this into a syrup prepared in the following manner: Place a plug of cotton in the neck of a percolator, and a layer of cotton on the bottom of the percolator. Upon this place 50 Gm. powdered animal charcoal, and upon it the sugar (500 Gm.). Percolate with a menstruum of glycerine, 150 Cc., and distilled water, 700 Cc. After this has passed through, run in an addi-

tional 100 Cc. of distilled water to dissolve any sugar which may remain. When this has passed through, the syrup is ready to be mixed with the acid solution obtained as above. When carefully made by this formula the product will be a colorless syrup free from free iodine and of full U. S. P. strength.—*Alumni Rep.*, Nov., 1903, 143.

Syrup of Iodo-Tannin—A Non-Toxic Preparation of Iodine.—Dr. Wyatt Wingrave, being equally interested in the supplemental treatment of enlarged glands and adenoids with iodine, has made several experiments with preparations of that drug with the object of finding one which could be given internally in large doses for considerable periods without causing any symptom of iodism, while exercising its specific effects on lymphatic enlargements. The following formula has been perfected for him by W. H. Martindale: Syr. iodo-tannin: iodine, 2.5 Gm.; tannic acid, 4 Gm.; alcohol (90 per cent.). 38 Cc.; syrup, 95 to 75 Cc. Dissolve the iodine in the alcohol, add the tannic acid and 30 Cc. of the syrup; heat to just below boiling-point until the solution affords no evidence of free iodine with the starch reaction (about twenty minutes). Cool and add the remainder of the syrup, with flavoring. Each drachm contains 2 grains of iodine. It may be given in doses of $\frac{1}{2}$ to 2 drachms in water or wine before meals, according to age. The preparation is easily made and very palatable. The iodine is in loose chemical combination with tannic acid, since none can be demonstrated as free, yet it is sufficiently free to be readily given up to the tissues after absorption, and consequently there is no fear of any local intestinal or gastric irritation, so often associated with the administration of free iodine. Such combination is of a nature similar to that of oxyhæmoglobin.—*Pharm. Journ.*, April 30, 1904, 581; from *Med. Press*, 128, 360.

Syrup of Tolu—Improved Formula.—Daisy Rhodes Shiffer offers the following as an improvement on the U. S. P. method for making syrupus tolutani: First make a 50 per cent. tincture of tolu by dissolving 40 Gm. balsam of tolu in sufficient alcohol to make 50 Cc. of filtered tincture. This is to be used only for the preparation of the syrup.

Take of this 50 per cent. tincture of tolu.....	20 Cc.
Purified talcum.....	50 Gm.
Sugar	850 Gm.
Water, sufficient to make.....	1000 Cc.

Proceed as in the U. S. P. process.—*Alumni Rep.*, Nov. 1903, 143.

Cough Balsam—Formula.—John Cully recommends the following formula for preparing a very efficient and satisfactory cough balsam:

a.—Tar water	6 pints.
b.—Wild-cherry bark	2 lb.
Glycerin	1 $\frac{1}{4}$ lb.
Water, percolate to.....	5 pints.

c.—Balsam tolu	1 1/3 oz.
Gum turpentine	1 1/3 oz.
Spruce gum	1 1/3 oz.
Alcohol.....	12 fl. oz.
Magnes. carbonate, powd.	2 oz.
Fld. ext. horehound.	6 fl. oz.
Fld. ext. ipecac.	4 fl. oz.
Tinct. blood root.	3 fl. oz.

Mix *a* and *c*, a small quantity at a time, thoroughly shaking, then add *b* in like manner, filter, then add

Sugar.....	18 lb.
Morphine acetate.....	120 gr.

Mix, strain and add

Syrup, to make.....	3 gals.
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The *Tar Water* for *a* is prepared as follows :

Pine tar.....	12 oz.
Cold water	30 fl. oz.

Mix, let stand 24 hours, pour off the water, and add

Boiling water	6 pints.
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Let stand 24 hours and then filter, adding water to make 6 pints.—
Merck's Rep., Febr., 1904, 39.

TABELLÆ.

Tablets—Austrian Regulations Concerning their Use.—Professor John Uri Lloyd, taking as his text a regulation of the Austrian government “making it necessary to secure the consent of the Minister of the Interior before stocking any kind of compressed tablets,” discusses this arbitrary regulation in contrast with the equally arbitrary methods of the “tablet faddists,” who insist on the superiority of the tablets to all other forms of medication. He concludes that “discrimination is what we need, discriminative thought, justice to the tablet, and when the Austrian government, on the one hand, puts its seal of disapproval on the entire list, and the enthusiastic tablet faddist, on the other hand, puts his seal of approval as universally in favor of that which cannot be, can we expect that anything else than wrong will come in a direction where really there is some right? Let us protest alike against the methods of both parties; the extremist who praises by one universal rule, and the critic who condemns by another universal rule, and beg from the professions at large, both in pharmacy and in medicine, the discriminative thought that should be applied to a class of substances that presents, in some directions, advantages

that may be useful to the sick."—Midland Drugg., May, 1904, 841; from Med. Gleaner.

Tablets and Pills—Causes of Unsatisfactory Quality.—Joseph R. Wood discusses some of the causes of the unsatisfactory character of tablets and pills so frequently complained of in the medical and pharmaceutical journals, which he attributes largely to the fact that many of the smaller manufacturers depend upon bought powdered extracts—some good, some bad—for their preparation, on account of their great convenience. A list of *powdered extracts* of considerable length could be given, each of which should be placed under a strict ban. Among these may be mentioned buchu, cannabis indica, chamomile, colchicum, brown top, cubeb, damiana, sumbul, saw palmetto, valerian. The remedy is to prepare solid extracts by careful concentration of the extractive matter in a vacuum still, and to use only such. One reason for the inefficiency of pill, tablet, capsule, and even powder medication, is the neglect of the patient to take a draught of water with the dose. Physicians should insist that a draught of water or other suitable fluid be taken by the patient with each dose when the medicine is in solid form. Lack of strong, characteristic odor, and lack of ready solubility or disintegration of the pill or tablet are points to be guarded against. The ready solubility of the coating, if any there be, is of course an important factor.—Amer. Drugg., 44, No. 4 (Febr. 22, 1904), 105-106; from Proc. Rhode Island Pharm. Assoc., Jan., 1904.

Medicinal Tablets—Manufacture.—L. H. Hunter contributes the first of a series of articles on the various processes involved in the manufacture of medicinal tablets, confining himself in this to the subject of compressed tablets. These may be made lozenge form or have flat or oval surfaces. They are made from granulated materials and not from powders, as the latter do not feed evenly or compress regularly. Some drugs compress without any special treatment, while others, being unadhesive, must be specially treated before they can be compressed. With chemical salts like potassium chlorate or iodid, the three bromids, or those possessing a definite crystal, no preparation is necessary, they being reduced to a No. 20 powder and compressed. When amorphous powders or powdered drugs are to be compressed, they are first reduced to a fine powder ranging from No. 80 to No. 120, this being necessary to pulverize any crystals in the powder, or to remove specks of foreign material or woody or cellular fibre from the drug. They are then made into a granular powder by moistening with suitable menstruum, until they aggregate into fine lumps which are forced through a sieve while yet moist, dried out at a moderate degree of temperature, ground to a moderate degree of fineness and then compressed. When extracts are used, they are mixed with materials known as excipients, such as sugar of milk, starch or magnesia, to dry out the moisture or absorb the oily resin, or with acacia and dextrin, to give the sticky mass a tenacious body. In this condition the ex-

tracts are then kneaded in a pill-mass machine until the heat developed, aided by the excipients, dries out nearly all the moisture, leaving a hard granite-like mass. After cooling, the mass becomes brittle, and is ground to a moderately fine powder and compressed. Therefore, granulations may be divided into two classes, masses and granulations proper. The processes of preparing these and the precaution to be observed in the subsequent operations of admixture, compression, etc., are given in detail, but can be advantageously consulted in the original only, in *West. Drugg.*, May, 1904, 219-221.

Compressed Tablets—Preliminary Treatment of Material.—In the course of a paper on making compressed tablets, George B. Weideman states that the ingredients must first be reduced to a very fine powder; granulated, dried and lubricated before the material is ready for compression. After thoroughly mixing the powder, it is usually granulated by the aid of water, dilute alcohol, or a mixture of syrup and water, water making the firmer granule, and therefore preferable when it can be used. The powder is moistened until it has the consistency of dough, and is then forced through a No. 16 sieve for large tablets, or through a No. 20 sieve for the small ones, the granules thus produced being dried by spreading out on paper in a dry place, or, under certain circumstances, in a drying oven to facilitate the drying—the material being protected from dust when simply spread on paper by placing a sheet of paper over it. When thoroughly dry, the granulated material requires lubrication. The manufacturer accomplishes this by means of 10 to 12 drops of liquid petrolatum to the pound, and about 2 per cent. of talcum; but in the author's experience the talcum alone will suffice, and is so used preferably. Some material can be compressed without preliminary treatment; with others special additions must be made and special manipulation is required.—*Amer. Jour. Pharm.*, 76, No. 1 (Jan., 1904), 30, 31.

Compressed Tablets—Preparation by the Aid of Emulsion of Oil of Theobroma.—In a previous paper (see *Proceedings*, 1903, 671), Edmund White, in conjunction with R. A. Robinson, had described a method for preparing compressed tablets by the aid of oil of theobroma. The method, while well adapted to the preparation of such tablets on a small scale, was, however, inapplicable for manufacturing purposes, since, in the absence of a provision for granulating the medicinal powders, the use of an automatic feeding arrangement was impracticable. In conjunction with Henry Rodwell, Mr. White has since turned his attention to the possible modification of the method, which would enable it to be used for manufacturing purposes, and they have succeeded in solving the problem by two methods, the one or the other to be selected according to the nature of the material to be compressed. The first of these methods involves the use of the oil of theobroma in the form of an aqueous

Theobroma Emulsion.—This is applicable to such substances as do not

form tough or doughy masses when moistened with water, and is available for the greater number of substances required in tablet form. It is prepared by dissolving 5 parts of hard soap in 25 parts of water by heat, adding the hot solution to 25 parts of oil of theobroma, previously melted, and mixing this by whisking or agitation; then 0.5 part of tragacanth (or acacia, if preferred) is shaken into the mixture, followed by 0.25 part of benzoic acid and enough water to make 100 parts of emulsion, which, when successfully prepared, should be thick-creamy and free from lumps. The method of the application of this emulsion is quite simple. The substance to be compressed, in the finest possible powder, is triturated with sufficient of the emulsion to form a damp, coherent powder—so damp that it can be shaken through a No. 20 or 30 sieve without pressure and without adhering to the meshes; the sifted product, after exposure to the air for a few hours, or, better, during the night, is ready for compression. The second method requires the use of an

Ether-Alcohol Solution of Theobroma.—This is applicable to vegetable drugs, such as aloes and other substances, which form pill-like masses when moistened with water, and is prepared by dissolving 1 fluidounce of (melted, Rep.) oil of theobroma in 6 fluidounces of ether, and adding to this solution, when required for use, an equal volume of alcohol. The manner of granulating with this solution is to add the whole quantity required to the substance contained in a mortar *at once*, triturating as quickly as possible, then passing the damp powder through a No. 20 or 30 sieve, and allowing the granular powder to dry by exposure for an hour or two, although in some cases it may be compressed almost immediately. Cane sugar granulates remarkably well with this solution, as it does also with the emulsion, and is therefore recommended as the most suitable diluent for the active medicinal substance by either method. The authors conclude their paper with a number of formulas for tablets by the two methods, and some general remarks concerning special formulas, which must be consulted in the original.—Trans. Brit. Pharm. Conf., 1903, 487-494.

Tablets—A Cheap and Good Machine.—C. R. Ambrose states that a cheap and good tablet machine may be made as follows: Select a rifle cartridge of size desired, file off the head, pull bullet, and polish brightly. Procure a steel rod to fit the barrel of the cartridge; if one is not at hand, one can be bought at a machine-shop at a cost of about 20 cents, including the concaving of the under surface. Now get a smooth, hard piece of metal for a base and the trick is done. To use: Having divided or weighed out the prescribed powder, place it in the cartridge cylinder resting on its metal base, insert the steel rod or plunger and strike it smartly with a stick of wood, then turn the cartridge and rod upside down, rest rod on table and pull down on cartridge, when tablet will be forced

out and fall on the table. If, after striking the rod, a rotary twist is given to it, the tablet will take on a polish.—*Amer. Drugg.*, 43, No. 4 (Aug. 24, 1903), 95.

Effervescent Corrosive Sublimate Tablets—A Rapidly Soluble Form.—Dr. Meyer calls attention to a Swiss specialty which presents corrosive sublimate tablets in effervescent form, which facilitates the rapidity of their solution, reducing the time usually required to about one half. The method of their preparation, or the nature of the added ingredients is not given—possibly under the conviction that such tablets can only be made reliably on an industrial scale.—*Schw. Wschr. f. Pharm.*, 41, No. 42 (Oct. 17, 1903), 501.

Referring to the above, Santer contends that the additions of such substances as alkaline or other carbonates, vegetable acids, or acid salts, are inadvisable. The additions of chloride alone are admissible.—*Ibid.* (Oct. 31, 1903), 527.

TINCTURÆ.

Tinctures—Determination of Alcohol.—T. F. Harvey finds the method described by Allen for the determination of alcohol in tinctures containing essential oils and other volatile constituents to be defective, chiefly on the ground that the use of precipitated calcium phosphate requires the dilution of the tincture with from 4 to 8 times its volume of water, which increases the limit of error in the subsequent determination of alcohol in the distillate by the aid of sp. gr. tables. In the Allen process, after the dilution of the tincture with water in proportions varying according to the nature of the tincture, the calcium phosphate is added, the mixture filtered and distilled. The errors mentioned may be largely avoided, however, by subjecting the tincture, after dilution with two, or, in some cases, three times its volume of water, distilling at once, and then treating the distillate, not with calcium phosphate, but with kieselguhr, to remove the undissolved oil. Instead of kieselguhr, which must be well washed and dried, washed kaolin may be employed with equally good results, the process in either case being rapid if the following details are carefully observed: Heat water in a large vessel (an enameled iron basin, 12 inches by 4½ inches, answers well) to 15.5° C., and maintain at this temperature by adding from time to time some warmer or colder water. Place the bottles containing the tinctures in this bath for a short time. Measure 50 Cc. of tincture in a graduated flask at 15.5° C. Transfer to a 500 Cc. conical flask, rinsing out with two or three portions of water, amounting to 70 Cc. in all, so that the total volume in the distillation flask is about 120 Cc. To prevent frothing and bumping add two or three drops of liquid paraffin B. P., and some ignited pipeclay. Distil slowly over a rose-burner 97 Cc. into a 100 Cc. flask, and make up the volume to 100 Cc., at 15.5° C. with

distilled water. If the distillate is clear and bright, or very nearly so, the sp. gr. is determined, and the corresponding percentage of alcohol multiplied by 2. If the distillate is in any way turbid, add to it 0.5 gram of kieselguhr, which has been washed free from soluble matter and dried. Stand for a short time (about ten minutes), with frequent shaking in as cold water as is obtainable. Filter rapidly through a plaited filter, rejecting the first portion, and take up the sp. gr. of the clear filtrate at 15.5° C. The advantages of this method as compared with the calcium phosphate method are :

1. Partial elimination of error due to dilution, and complete elimination of that due to precipitated resin, are secured.
2. The method is more simple and rapid.
3. Evaporation during filtration is minimized.
4. There is at no stage any difficulty caused by froth in the adjustment to volume, to which one is very liable when dilution and filtration precede distillation.
5. A bright liquid is always obtained for the sp. gr. determination.—Chem. and Drugg., Jan. 30, 1904, 178.

In a separate paper, immediately following the preceding, the author publishes a table exhibiting the figures obtained in the determinations of the specific gravities, total solids, and percentages of alcohol—the latter by the above-mentioned improved method—in the tinctures of the B. P., these figures showing the average of varying and generally very large numbers of determinations in each case. The scope of this table being identical with the following abstract, it need not be reproduced here, but may be profitably consulted by interested experimenters in the original.—Chem. and Drugg., Jan. 30, 1904, 178–179.

Tinctures, Liquors and Liquid Extracts of the B. P.—Average Percentages of Extractive and Alcoholic Content.—The following figures are the result of a compilation by J. E. Brunhar of the recorded percentages of extractive and alcohol found in tinctures, liquors and liquid extracts of the B. P., as presented in the annual report of the Local Government Board for Ireland :

Tinctura.	No. of Samples Examined.	Average Recorded Percentage.	
		Extractive	Alcohol
Aconiti	10	1.2	67.18
Arnice	2	.79	69.35
Asafetide	1	6.13	67.28
Aurantii	63	1.93	75.6
Belladonnæ	55	.93	59.46
Benzoini comp.	36	16.7	75.8
Buchu	44	3.84	56.9
Calumbæ	116	.96	56.9
Camphoræ comp.	441	.35	58.5
Cannabis indicæ	5	3.96	87.8
Cantharidis	3	.25	87
Capsici	24	1.08	69.6
Cardamomi comp.	122	6.9	55.78
Catechu	41	16	52.6
Chloroform. et morphinæ comp.	41	31.4	44.9
Cinchonæ	174	6.67	65.4
Colchici sem.	11	3.7	43.5
Digitalis	165	3.8	55.8
Ergotæ ammon	6	4.4	52.2
Ferri perchloridi	65	—	23.6
Gelsemii	3	1.37	55
Gentianæ comp.	217	5.13	44.5
Guaiaci ammoniata	6	13.18	75
Hydrastis	10	2.16	58
Hyoscyami	84	2.8	43.64
Iodi	40	—	86.6
Jaborandi	9	3.05	45.8
Jalapæ	7	3.95	67.6
Kino	7	21.1	48
Lavandulæ comp.	20	.67	88
Lobeliæ ætherea	10	1.84	69
Myrrhæ	12	4.48	85.2
Nucis vomicæ	128	2.55	64
Opii	161	3.63	44
Podophylli	7	3.38	87
Quinina	25	3.6	74
“ ammoniata	29	1.88	53.8
Rhei comp	75	15.8	51
Scillæ	127	11.8	54
Senegæ	89	6.25	56.8
Sennæ comp	21	9.81	40.85
Stramonii	5	3.35	43
Strophanthi	15	.55	67
Valerianæ ammoniata	17	3.73	54
Zingiberis	48	.54	88.5

Extractum—Liquidum.	No. of Samples Examined.	Average Recorded Percentage.	
		Extractive.	Alcohol.
Cascarae sagradae	263	23.8	18.27
Ergotae	112	13.57	32.8
Glycyrrhizae	14	44	18
Opii	10	3.2	17.64
Pareirae	6	14.76	22.2

Liquor.	No. of Samples Examined.	Average Recorded Percentage.	
		Extractive.	Alcohol.
Calumbae conc.	75	3.9	20.2
Chiratae conc.	19	3.85	20.3
Hamamelidis	15	.05	15.16
Iodi fort.	31	—	73.1
Picis carbonis.	8	3.12	81.6
Quassiae conc.	52	.4	20
Rhei conc.	25	12.4	19.3
Sarsae comp. conc.	13	11.08	20.2
Senegae conc.	87	12.6	23.7
Sennae conc.	4	13.9	20.1

—Chem. & Drugg., June 11, 1904, 967.

Resinous Tinctures—Dispensing in Aqueous Vehicles.—Harold Wilson has made some practical experiments with the object of determining the following questions :

(1) Is any suspending agent required when a resinous tincture is dispensed in an aqueous vehicle?

(2) If so, what are the relative values of acacia and tragacanth under varying conditions?

The first question was answered by observing the results obtained by dispensing each tincture, first with distilled water alone, in the proportion of 1 to 8, and then with water containing chloride of sodium sufficient to make 10 grains in a fluid ounce of the mixture. It was proved that when distilled water alone was used, easily diffusible precipitates were obtained with the following tinctures: *Cimicifuga*, *hydrastis*, *lupuli* (= *hops*), *podophylli*, *benzoini simplicis* and *myrrha*, the last two, however, remaining satisfactory only for a few days in the proportions mentioned, although much

more permanent when the quantity of tincture was reduced. Separation of resin or other matter not readily diffusible was more or less rapid with the following tinctures: *Asafetida*, *benzoini composita*, *cannabis indica*, *cubebæ*, *guaiaci ammoniata*, *jalapæ*, *sumbul*, *tolutana*, and to these must be added *benzoini simplicis* and *myrrhæ* when used in quantity. But when solution of salt was employed instead of distilled water, they, with the exception of the tinctures of *cimicifugæ* and *lupuli* (= *hops*) required, the addition of some suspending agent to form a satisfactory mixture.

To determine the second question parallel experiments were made with mucilage of acacia and mucilage of tragacanth, using these in the proportions of: Tincture, 1 drachm, mucilage, 1 drachm, and water, enough to make 1 ounce, and when neither of these proved satisfactory, 1 drachm of each of the mucilages were used to make an ounce of the mixture. In any case, the mucilage was diluted as much as possible with water, and the tincture then added, this having proven on trial the most satisfactory. Remembering that the author refers to the preparations of the British Pharmacopœia, the results of the author's experiments went to show that in each case *acacia* yielded a more elegant mixture than *tragacanth*; but when the quantity of precipitated matter was considerable it was unsuitable, owing to the fact that the separated matter adhered to the base of the bottle, and could only be diffused with difficulty. On the basis of these observations the following list has been arranged, and will doubtless prove useful for reference:

Asafetida—Acacia to be used in all cases, because more elegant than tragacanth, which in other respects is equally good.

Benzoin Co.—Acacia and tragacanth must both be used in all cases.

Benzoin Simp.—No addition is necessary in absence of salts if quantity be small. Acacia good in all cases. Tragacanth good in absence of salts, but useless in their presence.

Cannabis Ind.—Use acacia in absence of salts and tragacanth in presence of salts.

Cimicifuga.—No addition necessary in any case.

Cubeb and Guaiac. Ammon.—Use acacia in all cases.

Hydrastis—No addition necessary in absence of salts. Use tragacanth in presence of salts.

Jalap—Use tragacanth in all cases.

Lupulus—Same as in *cimicifuga*.

Myrrh—No addition necessary in absence of salts if quantity be small. If quantity be large, tragacanth should be used in all cases.

Podophyllum—No addition absolutely necessary in any case, but the addition of acacia makes a more elegant mixture in the presence of salts.

Quinine Ammon.—Use acacia in all cases, but such mixtures become unrepresentable after about fourteen days.

Sumbul—Same as cubeb.

Tolu—Same as benz. co.

It may be emphasized that these recommendations are the result of observations on the keeping properties of all the mixtures made. None has been kept less than a month, and it has been found that what yields the most elegant product when freshly prepared may become anything but satisfactory on keeping.—Pharm. Journ., Nov. 14, 1903, 706-708.

Resinous Tinctures—Preparation by "Re-maceration."—Hans Helch has made experiments to determine the relative value of three different methods for preparing the resinous tinctures, viz., "maceration," "re-maceration," and "percolation"—the process of "re-maceration" (or "repeated maceration") being conducted as follows: The coarsely powdered drug is macerated with menstruum in the proportion of 1 part of the drug to $2\frac{1}{2}$ parts of the menstruum, for several days with occasional agitation; the liquid is decanted, and the residue is macerated twice more in the same way, first with $1\frac{1}{2}$ parts and last with 1 part of the menstruum, the tincture being finished by mixing the three decantates. Simple "maceration" was carried out in the usual manner; while the "percolated" tinctures were obtained by maceration and agitation with $2\frac{1}{2}$ parts of menstruum for 4 days, then transferring the mixture to a percolator, and percolating with the addition of more menstruum until the requisite quantity was obtained (5 parts from 1 of drug). It was determined that "re-maceration" may replace the process of "percolation" as described, perfectly in the case of the tinctures of myrrh, guaiac and benzoin, and that while catechu is not so well extracted, the difficulty of extraction by "percolation" leaves the advantage with "re-maceration." The latter process possesses the further advantage that the period of maceration may be considerably shortened.—West. Drugg., Aug., 1903, 414; from "Pharm. Prat."

Tinctures—Modification of Official Methods.—Paul Caldwell observes that while the U. S. P. directs some tinctures to be merely moistened and packed and others to be moistened, packed and macerated with enough of the menstruum to cover the surface of the drug, he prefers to use the latter method exclusively, pouring all the menstruum required for the finished product on the drug at once and macerating for 24 hours or longer before collecting the percolate.

Compound Tincture of Benzoin is well made by dissolving the benzoin and tolu in alcohol and adding the storax, previously warmed, to the solution; then macerating the aloes in alcohol, with frequent agitation, for twenty-four hours, mixing the two solutions, and filtering.

Deodorized Tincture of Opium is with advantage prepared from opium repeatedly washed with benzin; and, in like manner,

Tincture of Strophanthus is best made from the seed, treated with successive portions of benzin in order to remove the fat from them.—So. Drugg. Journ., Dec., 1903, 186.

Compound Tincture of Benzoin.—Improved Manipulation.—H. A. B. Dunning observes that the digestion of the material for the preparation of compound tincture of benzoin at the temperature of 65°C ., as directed by the Pharmacopœia, is a source of much worry to the manipulators, sometimes causing the loss of material, due to the breaking of containers. The process of digestion at a raised temperature may be avoided if the tolu balsam and storax be fused together in a water-bath, at a low temperature, and dissolved in a portion of the alcohol. The alcoholic solution of the balsams, the powdered aloes, and powdered benzoin, are mixed with the balance of the alcohol, and are allowed to macerate for seven days or more, and then filtered.—*Drugg. Circ.*, 48, No. 2 (Febr., 1904), 29.

Compound Tincture of Benzoin.—Determination of Total Solids.—E. Dowzard observes that the determination of total solids in compound tincture of benzoin by drying at 100°C . gives very erroneous results, owing to the volatile nature of the benzoic acid present; the cinnamic acid is also slightly volatile, but not to the same extent. Owing to this fact, the residue must be heated for many hours before a constant weight is attained. If a small quantity of magnesium oxide is added to the tincture before driving off the alcohol, non-volatile salts are formed, and constant results are obtained after a few hours' drying; the slight loss of water, owing to the formation of magnesium compounds, may be ignored. On this the author bases a method which he describes in detail. The weight of magnesium oxide, used for fixing the benzoic and cinnamic acids which are part of the total solids, must, of course, be subtracted from the result. A batch of tincture, made on the manufacturing scale, was found to contain 19.4 grams of extractive per 100 Cc. when tested by the above method, using magnesium oxide as a fixing method. If the extractive from compound tincture of benzoin is dried to a constant weight at 100°C ., the results will be from 2 per cent. to 25 per cent. below the actual amount of total solids present.—*Chem. & Drugg.*, Febr. 20, 1904, 327.

Compound Tincture of Benzoin, B. P.—Standard Percentage of Extractive.—Alfred Wright communicates the results of a comprehensive series of experiments, undertaken with the object of ascertaining the cause of variation in extractive of compound tincture of benzoin as found in commerce, and also to inquire into the correctness of the standard—180 Gm. of solid extract in 1000 Cc.—recommended by Dr. Hill in a report to the Health Committee of Birmingham, on the basis of experiments made by him, and advocated also by a well known manufacturing chemist and by the chemist of the Chemists' Defense Association. Mr. Wright's experiments consisted, in the first place, of assays of the drugs, in the different commercial grades that are used for preparing the tincture, by which he obtained the following figures as regards solubility in B. P. alcohol:

Socotrine aloes.....	83	per cent.
Balsam of tolu.....	94.25	" "
Storax purified by pure spirit.....	89.5	" "
Storax purified by methylated spirit.....	91	" "
Storax unpurified.....	58	" "
Siam benzoin, first quality.....	95.5	" "
Siam benzoin, second quality.....	96.75	" "
Sumatra benzoin, first quality.....	96.25	" "
Sumatra benzoin, second quality.....	67.25	" "
Sumatra benzoin, third quality.....	73.25	" "

With these drugs he prepared half-pint samples of compound tincture of benzoin and obtained the following results :

	Specific Gravity.	Amount of Extractive per Liter.
Siam benzoin, first quality.....	0.892	200.2 Gm.
Siam benzoin, second quality.....	0.802	200.4 "
Sumatra benzoin, first quality.....	0.892	200.2 "
Sumatra benzoin, first quality, with unpurified storax..	0.887	162 "
Sumatra benzoin, first quality, with methylated spirit purified storax.....	0.802	190.1 "
Sumatra benzoin, second quality.....	0.885	172 "
Sumatra benzoin, third quality.....	0.887	194.2 "
Sumatra benzoin, third quality, with unpurified storax..	0.892	143 "

In the same way the author then subjected twenty-one samples of tincture from various parts of England, Scotland and Wales to examination, eight of them being classified as "home-made," nine as "made by wholesale houses," and 4 as "uncertain." It is not necessary to reproduce these figures, and it may suffice here to state that about one-half of these purchased tinctures approximated to or exceeded the standard; that the percentage of extract was only in two cases ("home-made," 106; "uncertain," 122.2) below 170 Gm. in 1000 Cc.; that the author is inclined to attribute the low percentages of extractive found to the use of *unpurified* storax; and that, although at the outset the author had believed the standard proposed by Dr. Hill and others to be too high, he now agrees with them that the adoption of 180 Gm. of extract in a liter is reasonable.—Trans. Brit. Pharm. Conf., 531-535.

Tincture of Huckleberries—Preparation and Use.—J. Tonchkin prepares a tincture of huckleberries, which has proven useful in the diarrhœa of children, by macerating the fresh fruit in an equal weight of 90 per cent. alcohol, and filtering off the tincture as needed. It is given in doses of 15 drops to a teaspoonful in warm sugar-water three times daily to children from 4 to 14 months old. It also relieves the attendant nausea or emesis and the swelling of the abdomen, and exerts apparently no untoward

effects.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 574; from Südd. Apoth. Ztg.

Tincture of Iodine—Importance of Using Pure Alcohol.—E. H. Gane records experiments which show that the rate of decomposition of tincture of iodine is in direct proportion to the purity of the alcohol used to prepare the tincture. An impure alcohol, that is, one containing free aldehyde or traces of higher homologues, will yield a tincture which commences to decompose almost as soon as made, and in three months' time may lose as high as $1\frac{1}{2}$ per cent. of its free iodine content. Experiments to determine the rate of decomposition gave the following results: The tincture was made from ordinary commercial 95 per cent. alcohol, and assayed 7.2 per cent. free iodine when made. After twelve months the sample kept in the dark contained 5.9 per cent. free iodine, while another sample exposed to ordinary diffused daylight during the year contained 6.1 per cent. free iodine. The alcohol from which this tincture was made was of fair purity, and the loss of about 1 per cent. free iodine may be taken as the normal amount lost by keeping tincture of iodine one year. Some tinctures will, however, lose more than 1 per cent. in three months, and in such cases the alcohol used will, in all probability, have contained considerable traces of aldehyde. Alcohol which contains traces of fusel oil yields a tincture which will show a loss of strength during the first week, while a pure article should yield a tincture which will maintain its strength for a period of three months at least. For preparing tincture of iodine druggists should use a pure grain alcohol as free from aldehyde as possible. Different batches of grain alcohol will be found to vary considerably in aldehyde content, while the alcohol prepared from molasses, which is very largely used at present, is not suitable in many instances for preparing tincture of iodine.—Amer. Drugg., 44, No. 2 (Jan. 25, 1904), 39.

Tincture of Iodine—Determination of Alcoholic Strength.—F. H. Alcock recommends the following method for determining the alcoholic strength of tincture (and also of liniment) of iodine: Shake a convenient quantity of the liquid under examination with an excess of metallic mercury until complete conversion of the iodine; then, to prevent the contamination of the distillate with distinct traces of mercuric iodide, add a small quantity of solution of potassium or sodium hydroxide, and distill off the alcohol in the usual way. The presence of mercuric iodide in the distillate must be avoided, since it vitiates the specific-gravity results. Pharm. Journ., Jan. 2, 1904, 9.

Tincture of Iodine—Prevention of Change by Borax.—According to A. Claret the formation of hydriodic acid in alcoholic solutions of iodine, such as the tincture of iodine of the Codex, may be prevented by the addition of two parts of borax for every one part of iodine used. The addition of borax also serves the purpose of removing hydriodic acid from

tinctures in which it has formed by age.—*Pharm. Journ.*, July 4, 1903, 8; from *Journ. Pharm. Chim.* (6), 17, 520.

Tincture of Iodine—Products of Decomposition.—It is well known that tincture of iodine, very soon after its preparation, loses a portion of its free iodine. The loss of free iodine has been variously attributed to the formation of ethyl iodide and to hydriodic acid, but in either case has not been taken into account in the U. S. P. method of determining the percentage of iodine in the tincture; the quantity of decinormal sodium hyposulphite simply showing the free iodine present. Philip Asher discusses this subject, and records the results of numerous experiments from which he concludes: 1. That ethyl iodide is not a product of the various changes. 2. That hydriodic acid is nearly always contained in the tinctures over one-week old. 3. That aldehyde is one of the products of the change that occurs in the tincture. Tincture of iodine, which during the first two days gave no evidence of change, showed a gradual development and increase in the amount of hydriodic acid formed, until, within a period of one month, from 13 per cent. to 15 per cent. of the iodine had been so converted.—*Proc. La. Pharm. Assoc.*, 48-53.

Tincture of Iodine—Utility in the Treatment of Bites and Insect Stings.—V. Gautier recommends tincture of iodine as the best all-around remedy, far surpassing even spirit of ammonia. In anthrax, iodine must be regarded, says the author, as a specific (?). In the form of Lugol's Solution it destroys cultures of anthrax bacilli of the most virulent description in a very brief period, when added to the amount of 50 per cent. of the culture. Gautier states that he was enabled, by the use of injections of iodine water, to save the life of rabbits previously infected with anthrax. The editor of the "*National Druggist*" observes in this connection that tincture of iodine is an old and well-known antidote to the sting of bees, wasps, etc., the only objection to its more frequent and general use being the stain left on the skin. This, however, soon vanishes, even when left to itself, but it may be almost instantly removed by moistening with ammonia water, which not only destroys the color, but reinforces the antidotal action of the iodine. Tincture of iodine will, in many instances, when applied early after infection, destroy the virus of poison oak.—*Nat. Drugg.*, Nov., 1903, 321; from *Centralbl. f. Bakteriologie*.

Tincture of Kino—Improved Formulas.—After experimenting practically for more than a decade with the various suggestions as to additions and menstrua that seem calculated to produce a permanent non-gelatinizable tincture of kino, George M. Beringer has come to the conclusion that the addition of any and all extraneous substances—such as glycerin, sugar, magnesium carbonate, potassa, ammonia, catechu, logwood, etc.—is undesirable, and that the following simple formula and process gives the most satisfactory results:

Take of—

Kino	100 grammes.
Diluted alcohol, sufficient quantity to make	1000 Cc.

Rub the kino in a mortar with 250 Cc. of diluted alcohol previously warmed to 50° C. When saturated decant the solution and repeat with successive portions of warm diluted alcohol until 1000 Cc. of the mixed solution is obtained. Filter and wash the filter and dregs with sufficient diluted alcohol to obtain 1000 Cc. of finished tincture. This should be bottled in small, well-corked vials, holding from 60 to 120 Cc., and kept in a cool, *dark* place. To obtain a satisfactory preparation, however, the selected material should be fresh and have a bright, transparent, garnet-colored fracture, and should be almost entirely soluble in alcohol, and give with cold water a deep red-colored solution and only a moderate amount of insoluble residue. Mr. J. H. Maiden (in 1889) fixed the qualifications for Australian kino necessary to obtain a satisfactory tincture as follows: "If kino is not completely and readily soluble in cold water, forming a clear ruby solution, with no gelatinous ruby-colored residue of phlobaphene, it should be rejected." This qualification will apply with but slight modification to the official or Indian kino.—Proc. Pa. Pharm. Assoc., 1903, 191-195.

F. E. Niece, on the other hand, comes to the conclusion that a tincture of kino that will keep well and not gelatinize may be obtained by slightly modifying the U. S. P. process, both in quality of menstruum and in manipulation, and recommends the following formula :

Kino.....	4.5 ozs.
Alcohol	25. ozs.
Water	7. ozs.
Glycerin	15. ozs.

Reduce the kino to a fine powder, add to it about 10 ounces of large, well-washed bird gravel. Place this in a suitable wide-mouth vessel, and add the alcohol and water previously mixed. Macerate for two weeks, occasionally stirring with a wooden implement, keeping the vessel well covered. Allow this to stand two days after two weeks of maceration without agitation, and pour off the supernatant liquid, pass through a pleated filter, and to the filtrate thus obtained add the glycerin by agitation. Fill a bottle with the entire amount, cork well, allow to stand a few days, then pour the tincture off carefully into eight-ounce bottles, well-filled and well-corked with paraffined corks. Store in cool, dark places. Made in this manner, the tincture will remain liquid for a long time.—*Ibid.*, 200-202.

Tincture of Kino—Preparation of a Non-Gelatinizing Product.—Having directed attention to the possible production of a non-gelatinizable kino during the process of collection (see Kino, under "Materia Medica"),

Edmund White suggests the following method for preparing a non-gelatinizable tincture from the kinos now found on the market: Add 2 ozs. of kino to 10 fl. ozs. of water in a suitable vessel, and maintain the whole at or near the temperature of 100° C. for fifteen minutes, agitating frequently. Allow to cool, replace the water lost by evaporation and add 10 fl. ozs. of 90 per cent. alcohol, let stand for twelve hours and strain. If the kino is fresh and of good quality it will almost entirely dissolve. In old samples more or less change, due to the action of the enzyme mentioned in the paper above referred to, will have occurred, and a corresponding amount of insoluble matter will have been formed.—Pharm. Journ., Nov. 14, 1903, 702.

Tinctura Lachnanthis—*Formula*.—George M. Beringer suggests the following formula for preparing a tincture of lachnanthis (see *Lachnanthes Tinctoria*, under "Materia Medica"), the plant having in recent years attracted some attention as a valuable remedy in the treatment of tuberculosis: Take of the fresh plant, freed from sand and dirt by washing in clear water, 1000 Gm.; cut up and pound to a pulp, add 1000 Cc. of alcohol, macerate for seven days, express, and repeat the addition of alcohol and expression until 2000 Cc. of tincture are obtained, which filter and preserve in well-corked vials.—Amer. Journ. Pharm., 76, No. 6 (June, 1904), 284-286.

Tinctures of Fresh Orange and Lemon Peels—*Preparation*.—Prof. Wilbur L. Scoville, in connection with an important formula for making "aromatic elixir" (which see), calls attention to the use of these tinctures of fresh orange and lemon peels, and their superiority over the oils of orange and lemon for this purpose. They are prepared by macerating thin shavings of the outer portion of the respective peels in alcohol for 48 hours, in proportion of 1 Gm. of peel to 2 Cc. of alcohol, draining the shavings through a filter and passing enough alcohol to make 50 per cent. tincture. The shavings are most conveniently obtained by peeling the fresh fruit, cutting the peel into strips not exceeding one-half inch in width, then, laying the strip on a flat board, shaving off the yellow layer with a sharp knife while holding the strip with the finger of one hand.—Amer. Journ. Pharm., 76, No. 4 (April, 1904), 158-162.

Tincture of Opium—*Direct Standardization vs. Preparation from Standardized Opium*.—Regarding it desirable that galenical preparations be prepared from the standardized drug instead of requiring the direct standardization of the finished preparation, W. Lyon has made some experiments upon tincture of opium in order to determine the practicability. He finds, however, that it is impracticable to extract the opium completely by following the process of the B. P., and that it is very improbable that any process of maceration or percolation or combination of both can be depended on to completely remove the alkaloid contained in the opium.—Pharm. Journ., Sept. 12, 1903, 401.

Tinctura Vanilla—*Method of Preparation*.—J. Lorenzen recommends the following rational method for the extraction of vanilla: 20 Gm. of the finely-cut fruits are triturated with 40 Gm. of previously well-dried sugar of milk, until a moderately coarse powder is produced. This is moistened with 10 Gm. of diluted alcohol, allowed to stand in a covered vessel two hours, transferred to a percolator, covered with 40 Gm. of diluted alcohol, and macerated for 8 days. It is then allowed to percolate under addition of sufficient diluted alcohol to make 110 Gm. of tincture. The resultant preparation, in distinction from the tincture of vanilla as ordinarily prepared, contains all the soluble constituents of the vanilla employed.—Pharm. Ztg., 48, No. 68 (Aug. 26, 1903), 691.

Extract of Vanilla—*A Satisfactory Formula*.—J. H. Dow recommends the following formula for preparing extract of vanilla, which among the many tried, has proven uniformly satisfactory: Vanilla, 8 ozs.; glycerin, 6 ozs.; granulated sugar, 1 lb.; water, 4 pints; alcohol (or cologne spirits), 4 pints. Cut or grind the beans very fine; rub with the glycerin and put in a wooden keg (a brandy cask, if possible); dissolve the sugar in the water, first heating the water if convenient; then mix the water and spirits and add to the vanilla. Keep in a warm place for three to six months before using, shaking often. To clarify, it is only necessary to percolate the liquid through the dregs. The color may be deepened by adding sugar coloring. To get the full benefit of vanilla beans, they should be put into maceration as soon as received.—Proc. Utah Pharm. Assoc., 1903, 59.

UNGUENTA.

U. S. P. Ointments—*Advantages of Lanolin as Base*.—Henry E. Nicaud observes that the difficulties which arise from making ointments, especially those of the U. S. P., consisting of a mixture of a metallic salt and a fatty base having in its composition fatty acids which have more or less action upon those chemicals, prove that the pharmacist should use a base which is perfectly free from such acids and of a neutral character, so that there can be no chemical change in the compound. Such ointments as the lead, zinc, mercurial and potassium iodide, in the experience of every pharmacist, have proved how easily they are decomposed by the fatty acids. For instance, red oxide of mercury ointment will turn to a grayish color on standing and form a mixture of oleopalmitate of mercury, which changes the therapeutic properties entirely. The physician is unable to receive the desired results from an ointment of this kind, except when freshly made. The same change occurs in other ointments of the U. S. P. containing metallic salts. There are a number of difficulties that may arise in the use of lard containing impurities owing to adulteration with water, alum, quick-lime and cotton-seed oil. It is a common occurrence for venders of lard to sell an article made from stearin and cotton-seed oil. Therefore chemical ointments made from bases containing the

fatty acids, and standing for any length of time, react upon oxides and carbonates which they contain and form oleates, palmitates and stearates, thus altering the entire chemical composition of the ointment or mechanical mixture. These difficulties are avoided if we use a neutral base, and the mixture is not liable to undergo the changes common to the fatty bases ordinarily employed, such a base being the lanolin or *adepts lanæ* of the U. S. P. This, when pure, is composed of cholestrin, ethers of oleic, palmitic, stearic, valerianic and other fatty acids. These acids, when neutralized and extracted from the crude purified wool fat, leave a perfect neutral base, which, when mixed with oxides and carbonates, does not act upon them, and leaves the ointment a perfect mixture, stable and unchangeable in all climates.—*Pharm. Era*, Jan. 7, 1904, 6.

Ointments—Practical Observations.—H. A. B. Dunning observes that the preparation of ointments, although probably deemed one of the minor operations of the dispensing art, is in reality one of the most important, as ointments are in many instances used for the soothing and healing of raw surfaces; and should the ointment contain gritty or crystalline substances it would prove an additional source of irritation. Therefore, the ingredients used in ointments should be of a high degree of fineness. It is suggested that all powders used for this purpose be bolted, not only to insure the absence of gritty particles, but also to obviate the difficulty of reducing a small quantity of crystalline matter to powder on an ointment slab, by rubbing with the flat side of a spatula. There are but few powders of general use in ointments, and these may be kept bolted in bulk. Regarding

Zinc Ointment, the author recommends the following manipulation: Rub the zinc oxide in a mortar with sufficient hot melted lard to make a smooth paste; then add the remainder of the melted lard and allow to stand a short time for any lumps which may form to settle. The upper homogeneous mixture is then passed off into a hot dish, and allowed to stand. The lumpy portion remaining in the mortar is rubbed to a smooth paste with the homogeneous mixture formed from the hot dish. Any lumps remaining in the dish should be treated in the same way as those in the mortar. This procedure may be continued until a perfectly smooth mixture is obtained, when the whole is stirred in the mortar until cold.—*Drugg. Circ.*, 48, No. 2 (Feb., 1904), 29.

Official Ointments—Practical Observations.—Paul Caldwell finds the cerate of the U. S. P. too hard, and recommends the reduction of the wax in the official formula to 250 Gm. The official

Cold Cream also seems to require modification. It has a tendency to become mealy (? Rep.) and has not the absorbing property it should have. The author obtains a smoother and finer ointment by changing the quantity of spermaceti in the formula to 100 Gm., and of the wax to 140 Gm.

Tar Ointment he recommends to be made by using 400 Cc. of oil of tar, 450 Gm. of lard, and 1500 Gm. of yellow wax. In making

Ointment of Lead Iodide, he recommends the use of 1 Gm. of sodium hyposulphite as in the formula for ointment of potassium iodide. The author has also experienced some trouble with

Citrine Ointment on account of its swelling after being finished. This is remedied by continuing the heating of the lard oil and nitric acid for a few minutes after effervescence has apparently ceased.—*So. Drug. Journ.*, Dec., 1903, 187.

Sterilized Ointments—Method of Preparation.—Instead of preserving ointments, after sterilization by heat, by means of stoppers of sterilized cotton, which is an inadequate protection, J. W. deWall proposes the preparation of sterilized ointments in wide-mouthed bottles, closed with a rubber stopper, in which they are to be dispensed. The finely-powdered substance can usually be mixed perfectly by shaking it with the melted fat, the process being exemplified by the author as follows: Weigh 60 Gm. of *vaseline* into a vial of 60 Gm. capacity and add 4 Gm. of the finely-powdered and sifted material—for instance, *boric acid*. Heat the mixture to 120°, close the vial with a rubber stopper and continue the heating between 120° and 130° for at least one hour. Then shake the vial vigorously until, on cooling, the ointment has congealed sufficiently to prevent separation of the powder. The process is, however, applicable only in cases in which the components are not unfavorably affected by the heating; for instance, zinc oxide or lead carbonate, which are liable to form plaster-like masses with saponifiable fats, can only be sterilized if *vaseline* is used as the base.—*Apoth. Ztg.*, 19, No. 38 (May 11, 1904), 327; from *Pharm. Weekbl.*, 1904, No. 18.

Ung. Paraffini, Pharm. Germ. IV.—Improved Formula.—Recent unfavorable criticisms of the *Pharm. Germ. IV.* for paraffin ointment led Riemer to point out the advantages of this ointment, and particularly its superiority as a base for other ointments over the mixtures of animal fats and of fixed oils formerly directed for their preparation. He admits, however, that the official paraffin ointment is deficient in absorbent qualities and in retaining a homogeneous consistence throughout the year. These faults, he finds, may be remedied by adopting the following modification, in which the paraffin may be replaced by ceresin, and a certain proportion of *adeps lanæ* added, the formula proposed being as follows: Paraffin. liq., 60; *adeps lanæ*, 10; ceresin, 30. The mixture should be effected at as moderate a temperature as practicable, and continuing the stirring of the melted mass until it congeals completely, finally running the ointment through an ointment mill. So obtained, the ointment has a good consistence, is miscible with an abundance of water, and melts at 42° to 50°. Its color cannot, however, be defined as "white," but rather as "whitish."—*Apoth. Ztg.*, 19, No. 12 (Febr. 10, 1904), 94.

Cearinum Solidum—A New Ointment Material.—Dr. Isleib has intro-

duced a new paraffin-like material which is white, odorless and neutral, and is claimed to be superior to the paraffin of the market. One part of this material with four parts of paraffinum liquidum yields a superior ointment which will replace the ung. paraffini, Ph. G., iv. As a matter of course, the ointment is exploited by the manufacturers in the various combinations which was intended to replace the different ointments of the Ph. G., iv.—Pharm. Ztg., 48, 82 (Oct. 24, 1903), 864.

Ceresin—A Substitute for Paraffin in Ointments.—C. Riemer, referring to the paraffin substitute introduced under the name of *Cearinum Solidum* (which see under "New Remedies"), recommends the commercial product "ceresin," which contains a certain proportion of the desired carnauba wax, as a chief and efficient substitute for the trade-named specialty.—Pharm. Ztg., 49, No. 7 (Jan. 23, 1904), 68.

Camphor Ice—Formula.—Julian A. Waller recommends the following formula for preparing "camphor ice:"

RECIPE	
Mutton suet.....	50 oz.
White wax.....	4 oz.
Camphor.....	10 oz.
Tincture benzoin.....	12 fl. dr.

Melt suet after cleaning well, then put on the stove, with about its own weight of water. After it is all melted strain both suet and water through cloth, and let stand twelve hours, then let all of the water run off. Again add enough water to about the equal weight of melted suet, and repeat the operation two or three times until the suet is perfectly clean and white. Then add the white wax and tincture of benzoin. Lastly, strain, add camphor, previously powdered, and strain again.—Merck's Rep., August, 1903, 218.

Catarrh Balm—Formula.—John Culley recommends the following formula for a "catarrh balm" which he has found very efficient and acceptable:

Cocaine alkaloid.....	10 grn.
Chloral-camphor (1:1).....	1 fl. oz.
Resorcin.....	2 dr.
Boric acid.....	2 oz.
Oil wintergreen.....	3 fl. dr.
Oil eucalyptus.....	2 fl. dr.
Menthol.....	2 dr.
White petrolatum.....	3 lb.

Mix together thoroughly all but the petrolatum. Melt the petrolatum, add the mixture, stir well together till nearly cold, then pour into collapsible tubes.—Merck's Rep., Febr., 1904, 39.

Cold Cream—Manipulation.—H. A. B. Dunning says that it is not so much a question of formula as the method of preparing cold cream that

will give the most satisfactory results. There are several essential requisites to a perfect cold cream. It should be creamy white, also firm yet soft in cold and hot weather, readily absorbed when rubbed upon the skin, leaving but a slight oily surface. A cold cream having these characteristics may be obtained by exercising proper care in the preparation. The wax and almond oil are fused together on a water-bath, and allowed to heat a short time after fusion has taken place; the borax (previously dissolved in the rose-water and heated to about the same temperature) is then added to the fat mixture all at once. After stirring until thoroughly mixed and of homogeneous cream appearance, it is removed from water-bath and whipped, ceasing while still warm, and running from dish to stock container. If the fat solution is not sufficiently hot, the borax is not allowed ample time to saponify, thereby producing an oily cream. For the same reason, the borax solution in the rose-water should be sufficiently hot, because, if cold, it would cause the precipitation of fat in lumps. Finally, it should be removed from the dish while still warm, because if allowed to cool in the open without stirring, the wax will collect at the top when it is colder; if stirred until cold, the cream will become granular, due to the separation of the water.—Proc. Md. Pharm. Assoc., 1903, 21.

Cold Cream—An "Ideal" Formula.—"L. L. W." observes that the number of formulas annually offered for cold cream is legion, and yet the fact of their being offered can only be taken as an indication that the majority fail to give satisfaction. This led him to examine into the merits of a large number of formulas, and finally to choose from among them the one considered best to fulfil the requirements demanded of such a preparation. The formula and directions for such an "ideal" cold cream are as follows:

In a porcelain or enameled dish put

White wax.....	℥ xiiss.
White oil.....	℥ xlvij.

Dissolve by means of a gentle heat, preferably on a water-bath. To this add a solution of

Borax.....	℥ v.
Distilled water.....	℥ xxiv.

Stir constantly till nearly cold, and then add while continuing the stirring

Oil rose geranium.....	℥ xl.
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The stirring is best done by means of an ordinary egg-beater.—Amer. Drugg., 43, No. 6 (Sept. 28, 1903), 168.

Cold Cream—Suitable Formula for Facial Massage.—John Culley recommends the following formula for a cold cream, or facial massage cream:

Expressed oil almond.	51	fl. oz.
Lanum	10	oz.
Paraffin.....	12½	oz.
White wax	12	oz.
Borax	1	oz.
Formaldehyde	1	fl. dr.
Hydrogen peroxide.....	1	fl. oz.
Oil rose geranium	60	min.
Oil rose	120	min.
Distilled water.....	18	fl. oz.

Melt together the paraffin and wax, add the almond oil, and then the lanum. Dissolve the borax in the water (hot), adding the formaldehyde and hydrogen peroxide. Mix the two solutions and stir and beat thoroughly until cold, then add the oils and continue mixing. The great secret of success in making "a cream that is a cream" is to have both the oil and water solutions hot before mixing.—Merck's Rep., Febr., 1904, 39.

Deschler's Salve—Improved Formula.—James W. Mader offers the following as an improvement on the former U. S. P. process for preparing Ceratum Resinæ Compositum (Deschler's Salve) :

	Metric.	Old Form.
Resin.....	280 Gm.	12 oz. av.
Yellow wax.....	160 Gm.	7 oz. av.
Turpentine	140 Gm.	6 oz. av.
Lard.....	420 Gm.	18 oz. av.

Melt together, strain through muslin and stir constantly until cool. If the ingredients are carefully selected, the resin, the kind known as "white resin," the turpentine fresh, soft and clean, and the lard and wax pure, a handsome cerate is produced. Only sufficient heat should be used to effect the melting of the ingredients.—Alumni Report, Nov., 1903, 143.

Unguentum Hydrargyri Flavum—Improved Process.—In a review of the different methods for the preparation of the yellow oxide of mercury ointment that shall combine stability with absolute smoothness, the addition of some lanolin to the vaseline base, as suggested by Schanz several years ago, is recommended. The formula should be as follows : Hydrarg. oxyd. flav. (recently prepared and in impalpable powder), 0.1 to 0.5 ; aq. distill., adeps lanæ, aa 1.0 to 2.0 : vaselin. amer. alb., ad. 10.0. The ointment to be dispensed in black jars.—Pharm. Ztg., 49, No. 5 (Jan. 20, 1904), 60.

Ointment of Yellow Mercuric Oxide—Improved Method of Preparation.—Dr. T. Knapp recommends the following method for the preparation of ointment of yellow mercuric oxide, which produces a product which is characterized by minute division of the mercuric oxide and absolute freedom from water : The mercuric oxide precipitated in the official manner is carefully washed by decantation until the chloride is completely removed. The water is then removed by washing the precipitate with 90

per cent. alcohol, this in turn by washing with spirit of ether, and the spirit of ether by washing with ether. The moist mercuric oxide, now containing only ether and completely freed from water and alcohol, is at once mixed with some white vaseline (American), the ether is removed by gentle heat, and is then triturated with sufficient vaseline to make a 10 per cent. ointment.—Schweitz. Wchschr. f. Chem. u. Pharm., 42, No. 1 (Jan. 2, 1904), 6.

Lead Ointment—Formula.—Julian L. Waller has found the following formula for lead (diachylon) ointment to give good satisfaction: Lead plaster, 16 ozs.; petrolatum, 6 ozs.; linseed oil, 2 fl. ozs.; oil of lavender, 2 fl. drachms. Melt the plaster in a water-bath and add the other ingredients. The product will always remain soft. The author also recommends a

Resorcin Paste (or ointment), to be made as follows: Dissolve 5 Gm. of resorcin in $7\frac{1}{2}$ Gm. of glycerin by the aid of gentle heat. Next melt together 6 Gm. of pure white wax and 100 Gm. of dehydrated lard, add to this slowly 15 Gm. of Hubbuck's oxide of zinc, and rub together thoroughly. Then add the resorcin solution and mix well.—Merck's Rep., Aug., 1903, 217.

Ointment—A Good Formula for General Use.—John Culley recommends the ointment made by the following formula for cuts, scalds, burns and all skin diseases: Oil of sassafras, oil of rosemary, carbolic acid, salicylic acid, ichthyol, of each 1 oz.; gum turpentine, 2 ozs.; precipitated sulphur, oxide of zinc, pine tar, of each 8 ozs.; petrolatum, 24 ozs. The author also recommends the following formula for

Pile Ointment.—Extr. ergot, extr. belladonna, extr. stramonium, extr. opium, of each 40 grains; powd. nutgalls, powd. sage, of each 1 oz.; benzoated lard, 16 oz. Mix, sec. art.—Merck's Rep., Febr., 1904, 40.

Gypsy Salves—Formulas.—Dr. Ralph St. John Perry gives the following three receipts for the manufacture of salves which are used by the gypsies living in the Mississippi Valley. When these formulas first came into his possession, he tried to "civilize" them by eliminating those ingredients which to his mind were inert; but he found that under the "civilizing" process the salves lost much of their value, and has since made them according to the exact formula and directions:

1. *Green Salve.* This cannot be surpassed when used for deep wounds, when made as follows:

Take:

White pine turpentine	8 oz.
Lard, fresh.....	8 oz.
Honey.....	4 oz.
Beeswax, yellow.....	4 oz.

Melt, stir well and add

Verdigris, powd.....	4 drs.
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M. Its application prevents the formation of proud flesh and keeps up a healthy discharge.

2. *Salve for all Wounds*, is used locally for cuts, burns, sores, ulcers, etc. It is made from

Lard, fresh.....	16 oz.
White lead, dry	3 oz.
Red lead, dry.....	1 oz.
Beeswax, yellow.....	3 oz.
Black resin.....	2 oz.

Mix, melt and boil for forty-five minutes, then add

Common turpentine	4 oz.
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Boil for three minutes and cool.

When applied, it first draws, then heals.

3. *Irritating Plaster (or Salve)* is made as follows :

Take :

Tar, purified.....	16 oz.
Burgundy pitch	1 oz.
White pine turpentine.....	1 oz.
Resin, common	1 oz.

Mix.—Melt and add—

Mandrake root, powd.....	1 dr.
Bloodroot, powd.....	1 oz.
Poke root, powd.....	1 oz.
Indian turnip root, powd.....	1 oz.

Mix.

This is applied (spread on muslin) and renewed daily. It will raise a sore which is to be wiped with a *dry* cloth to remove matter, etc., and is a powerful counter-irritant for removing internal pains and in other cases where an irritating plaster is necessary.—West. Drugg., July, 1903, 375 : from Wisc. Med. Record.

Inunction for Insect Bites—Various Formulas.—Brocq highly extols the following against bites and stings of insects of all descriptions :

Camphorated oil of chamomile	100 parts.
Balsam of styrax	20 parts.
Essential oil of mint.....	5 parts.

Mix.

Another highly extolled formula is the following :

Balsam of peru	1 part.
Styrax ointment	4 parts.
Olive oil.....	4 parts.
Mix.	

The following is proposed for the same purpose by Jacquet :

Naphthol.....	10 parts.
Menthol	1 part.
Ether, sufficient to dissolve.	
Petrolatum, q. s. to make.....	100 parts.

Dissolve the naphthol in ether, add the menthol, and finally incorporate the solution with the petrolatum.—West. Drugg., Nov. 1903, 321 ; from Gazette degli Ospidale.

VINA MEDICATA.

Medicated Wines of the U. S. P.—Advantage of Using—Detannated Wine.—While the U. S. P. does not direct the use of detannated wine, this is the kind employed by Paul Caldwell when making the official wines. The most striking advantage is seen in making the bitter wine of iron and the wine of iron citrate. In these preparations the tincture of sweet orange should also be detannated.—S. Drug. Journ., Dec., 1903, 187.

Beef wine and Iron—Formula.—John Culley recommends the following formula for beef-wine and iron: Beef extract, 8 ozs.; tinct. iron citrochloride (N. F.), 12 fl. ozs.; alcohol, 18 fl. ozs.; syrup, 18 fl. ozs.; detannated sherry wine, enough to make 3 gal. Add the alcohol, syrup, beef extract and tincture to sufficient of the wine, mix well, and allow to stand as long as possible before filtering and bottling. The

Detannated Wine is made by adding tincture of ferric chloride to the wine, a little at a time, until a further addition does not produce a dark color, then adding about 6 ozs. of fresh milk to each gallon of the wine; shake well, allow to stand a little while and filter.—Merck's Rep., Febr., 1904, 40.

MISCELLANEOUS FORMULAS.

Dentifrices—Useful and Satisfactory Formulas.—John Culley recommends formulas for several tooth preparations which he has found to give general satisfaction and have grown in good demand. The first of these, the

Tooth Powder, must be regarded as a new departure in dentifrices, since the usual chalk base is replaced by sugar of milk. The formula is as follows :

Powd. sugar milk	25 lb.
Oil cinnamon, Ceylon.....	1 fl. dr.
Oil wintergreen	4 fl. dr.
Oil peppermint	9 fl. dr.
Oil eucalyptus	1 fl. dr.

Mix. This powder is both soluble and antiseptic. The following formula for a

Tooth and Mouth Wash is also a good one, and thoroughly antiseptic:

Powd. castile soap.....	2 oz.
Glycerin.....	1 pint.
Alcohol.....	3 pints.
Water.....	5 pints.
Oil Wintergreen.....	160 drops.
Oil cassia.....	80 drops.
Oil eucalyptus.....	32 drops.
Thymol.....	16 grn.
Menthol.....	16 grn.
Resorcin.....	32 grn.
Solut. carmine N. F.....	to color.

Mix the oils, thymol, menthol, resorcin and alcohol, add the soap, then glycerin, lastly the water and color to suit. Let it stand a day; then cool to about 40° F., and filter. Another efficient preparation is a

Tooth Paste made by the following formula:

Thymol.....	6 gr.
Oil cassia.....	10 min.
Oil wintergreen.....	90 min.
Oil sassafras.....	30 min.
Alcohol.....	4 fl. dr.
Prepared chalk, powd.....	16 oz.
Precipitated chalk.....	16 oz.
Po. castile soap.....	1 oz.
Solut. carmine N. F., to color pink.	

Make into a paste with enough of the following mixture:

Saccharin.....	8 gr.
Glycerin.....	8 fl. oz.
Water.....	4 fl. oz.
Gelatin.....	$\frac{1}{8}$ oz.

Soak the gelatin in the water over night, then dissolve with heat and add glycerin and saccharin. The paste must be very thin and well mixed. It is dispensed in collapsible tubes.—Merck's Rep., Febr., 1904, 39.

Eau de Botot—Simplified Formula.—The following formula for "Eau de Botot," is given in the German Hospital Pharmacopœia:

Oil of cinnamon.....	5
Oil of cloves.....	5
Oil of anise.....	5
Oil of cedar.....	2
Oil of peppermint.....	10
Tincture of vanilla.....	50
Potassium bitartrate.....	10
Cochineal.....	10
Alcohol.....	1500
Water.....	500

Ink for Celluloid—Formula.—The following formula, suitable for an ink for writing on celluloid, is given in "Rev. Méd. Pharm. (10, 727) : Powdered tannin, 15 ; dry ferric chloride, 10 ; acetone, 100. Dissolve each of the dry ingredients separately, each in one-half the acetone, and mix the solutions.—Pharm. Journ., July 25, 1903, 121.

Ink—Removal of Stains.—Graham Bott recommends the following method, which is equally applicable for the removal of old or recent ink-stains, and has the advantage over other methods that it will not injure the most delicate fabric : The material requiring treatment is first soaked in clean, warm water, the superfluous mixture removed, and the fabric spread over a clean cloth. Now allow a few minims of liquor ammoniæ fortis, s. g. 0.891, to drop on to the ink spot, then saturate a tiny tuft of absorbent cotton with acidum phosphoricum dilutum, B. P., and apply repeatedly and with firm pressure over the stain ; repeat the procedure two or three times, and finally rinse well in warm water, afterwards drying in the sun, when every trace of ink will have vanished.—Pharm. Journ., July 25, 1903, 102.

Liquid Face Powder—Formula and Manipulation.—Julian L. Waller recommends the following formula and method for preparing an excellent "liquid face powder" which must be carefully followed to produce a satisfactory product : Dissolve 6 ozs. of bismuth subcarbonate in sufficient hydrochloric acid, and add water to the solution as long as a further addition produces a precipitate. Collect the precipitate on clean white filter-paper and wash it for at least ten days in order to remove all acid ; then press the moist precipitate through a fine bolting cloth by the aid of a spatula. To this precipitate add 34 ounces of drop chalk, rub the mixture thoroughly with 1 pint of alcohol in which 20 drops of oil of rose geranium or otto of rose have been dissolved, and finally dilute the mixture to 2½ gallons by the addition of rose or distilled water. The well-shaken mixture is then filled in suitable bottles for sale.—Merck's Rep., Aug., 1903, 217.

Rosamond Lotion—An Efficient Toilet Preparation.—J. F. O'Connell gives the following formula for an efficient toilet lotion :

Almond oil.....	℥ vi.
Spermaceti.....	℥ x.
Boric acid.....	℥ ij.
Glycerin.....	℥ x.
Rose water.....	℥ xvij.
Tincture of benzoin.....	℥ iij.
Alcohol.....	℥ iij.
Rose oil..	gtt. xx.
Neroli oil.....	gtt. xx.

Melt the spermaceti in the almond oil over a water-bath and transfer the hot mixture to a warmed mortar. Dissolve the boric acid in the rose

water and add the glycerin, and gradually incorporate the solution so formed with the melted spermaceti and oil contained in the mortar, stirring vigorously the while. In the alcohol dissolve the oils and the tincture of benzoin and add this to the cream first formed, mixing all thoroughly.—*Amer. Drugg.*, 43, No. 9 (Nov. 9, 1903), 269.

Rose Glycerin Jelly—Formula.—J. F. O'Connell gives the following formula for a toilet jelly, which is seasonable during the winter months, and has proven acceptable: Soak 1 oz. of the best French gelatin in 10 ozs. of water for 12 hours, then melt on the water-bath. When cold add 20 ozs. of glycerin and 10 ozs. of rose water, in which $\frac{1}{2}$ oz. of boric acid has been dissolved, tint the mixture with carmine, strain it through silk bolting cloth, and put up in 1-ounce glycerin-jelly jars.—*Amer. Drugg.* 43, No. 9 (Nov. 9, 1903), 268.

Witch Hazel Toilet Cream—Formula.—John Culley recommends the following formula for preparing a toilet cream, which proves very satisfactory if carefully made from the best material obtainable:

Quince seed (German)	1 $\frac{1}{4}$ lb.
Boiling water, sufficient to make	
Mucilage	2 $\frac{1}{2}$ gal.

To this add, a little at a time, thoroughly shaking after each addition:

Distilled ext. witch hazel	10 pints.
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Then add

Borax	5 oz.
Glycerin	5 lb.

Dissolve with the aid of heat, and add

Oil neroli	15 min.
Oil rose geranium	50 min.
Oil bergamot	24 min.
Oil bitter almond	5 min.
Menthol	25 grn.
Ext. white rose	4 fl. oz.
Alcohol	5 pints.

Mix thoroughly, shake and strain. The author also recommends the following formula for a

Liquid Face Powder or Enamel:

Flake white (English)	2 lb.
Glycerin	4 fl. oz.
Bay rum	4 fl. oz.
Rose water	4 fl. oz.
Borax	4 oz.
Essential oil almonds	5 drops.
Oil sweet orange	10 drops.
Distilled water	6 pints.

Sift the flake-white (which should be the best English) through cheese-cloth several times; add it to the water in gallon bottle, with the other ingredients, and shake well during a day. Let it stand till clear; skim off the scum. Shake well and bottle.—Merck's Rep., Febr., 1904, 39-40.

Toothache Drops—Formula.—John Culley recommends the following formula for toothache drops:

Oil cloves.....?	4 fl. dr.
Oil cajuput.....	4 fl. dr.
Oil peppermint	1 fl. dr.
Tincture capsicum.....	3 fl. dr.
Chloroform.....	6 fl. dr.
Ether	6 fl. oz.
Camphor	2 dr.
Alcohol.....	12 fl. dr.

Put up in a two-dram homeo-vial, label and seal the cork with paraffin.—Merck's Rep., Febr., 1904, 40.

C. NEW REMEDIES

AND TRADE-NAMED SPECIALITIES.

Modern Remedies—Influence of Nascent State on their Potency.—Referring to the well-known fact that the nascent state exalts the activity of bodies, and that by the use of such bodies it is possible to obtain the maximum therapeutic effect with a minimum dose, Dr. Albert Robin mentions a number of modern remedial agents, the superior efficiency of which is due to facility with which their active constituent is liberated when they come in contact with the living tissues of the human body. Thus oxygenated water, thanks to the nascent state of its oxygen when in contact with organic tissues, is one of the most powerful antiseptics known. It is pointed out by the author that the recent observation of Wiede, Melioff and Staedel, that oxygenated water can form a molecular combination with salts, and can take the place of part or all of their water, is of great therapeutic importance, since it is possible, and has been so found experimentally by the author, to modify and increase the therapeutic effects of certain salts by the substitution of oxygenated water for their constituent water of crystallization. Such, for instance, is a strong antiseptic action in addition to the astringent action of alum, or, by mixing common sodium sulphate with sodium sulphate containing a molecule of oxygenated water, the simultaneous evacuation of the intestine and its antiseptics. Then, again, some metallic peroxides give off nascent oxygen when they come in contact with the tissues, the metallic molecule playing a secondary role, permitting their advantageous use both for internal and external treatment.

But the value of the nascent state in therapeutics may be shown by other synthetic drugs. Thus, monochloral-antipyrine, which breaks up in the organism into its components, in their nascent state, is an analgesic of the central nervous system by its antipyrine and a hypnotic by its chloral, almost always induces sleep and calms the pain in the dose of 1 Gm., and, weight for weight, is more active than its two components. Similarly other synthetic compounds are mentioned, which, in each case, have been shown to be more effective than corresponding quantities of their individual components, because they are broken up in the system and produce their effect in the nascent condition.—Pharm. Journ., June 25, 1904, 862; from Proc. Acad. de Méd., Paris.

Adorin is the name given to a foot powder which is largely composed of paraformaldehyde.—Pharm. Ztg., 49, No. 45 (June 4, 1904), 472.

Aesco-Chinin (Aesco-Quinine) is the name given to a compound of quinine with glucosides obtained from the horsechestnut—*Aesculus hippocastanum*, which forms a yellowish amorphous powder, insoluble in water, but readily soluble in the presence of a trace of acid. It is bitter and contains 50 per cent. of quinine, and is supplied in form of tablets containing 0.1 Gm. of the compound, which are recommended for the treatment of colds, mild affections of the respiratory organs, cough, hoarseness and simple catarrhal affections, as also in nervous diseases—a single tablet given 3 to 5 times daily usually sufficing.—Pharm. Ztg., 48, No. 83 (Oct. 17, 1903), 815.

Alcohol-Cellit is the name given to a solid substance containing 60 per cent. of alcohol, obtained by dissolving "proto-cellit" (prepared under a German patent) in alcohol, and recommended for convenient use in alcohol-bandaging.—Pharm. Ztg., 48, No. 59 (July 25, 1903), 594.

Aldthyform is the name given to a disinfectant and deodorizer which is claimed to contain 25 per cent. of water-soluble thymol and 10 per cent. of formaldehyde.—Nat. Drugg., Jan., 1904, 13.

Ammonium Sulfothyolicum is the name of a Swiss substitute for ichthyol.

Anæmorenin is the name given to a preparation of the suprarenal gland used and recommended by Miller to produce anæsthesia in dental cases.—Berl. klin. Wchschr., 1904, No. 8.

Anesthol is the name given by Prof. W. Meyer to a mixture composed of chloroform, 43.25 vols.; ether, 56.75 vols.; and ethyl chloride, 20.5 vols., and recommended by him as an anæsthetic.—Centralbl. f. Gynäk., 1903, No. 24.

Antemesin is the name given to a specialty supplied in capsules, each containing 0.1 Gm. anæsthesin, which is recommended against nausea,

hyperæsthesia of the stomach and nervous dyspepsia.—Pharm. Ztg., 49, No. 18 (March 2, 1904), 191.

Anthrosol is the name given to a tar product, purified by special devices, and almost devoid of color. It is also more fluid than ordinary tar, and, although possessing the characteristic odor of tar, looks very much like olive oil, and is soluble in 90 per cent. of alcohol only to the extent of 10 per cent. It may be used in all cases in which tar is indicated, either pure or diluted with acetone or fixed oils, but its special use is in skin diseases, where it is exhibited in the form of ointments, pastes or glyceroles.—Nat. Drugg., Jan., 1904, 13.

Anticomitale is the name given to a specialty composed of potassium bromo-cyanide, strontium iodide, and extract of valerian, recommended for the treatment of epilepsy.—Pharm. Ztg., 48, No. 65 (Aug. 15, 1903), 655.

Antidipsin Tablets are medicaments intended to quench thirst during long marches, which are said to be simple confections of sugar, citric acid, and malic acid, flavored with some fruit-essence.—Pharm. Ztg., 48, No. 68 (Aug. 26, 1903), 693.

Antidysentericum is the name given to a specialty prepared from campeachy wood, pomegranate bark, and simaruba bark, which is claimed to possess great efficiency in the treatment of dysentery.—Münch. Med. Wschr., 1904, No. 15.

Antiphlogin is the name given by a specialty manufacturer to pyrazolon phenyldimethyl.

Antiputrol is the name given to a yellowish-brown, thick-liquid disinfectant, having a phenolic odor, which is soluble in water in all proportions, and contains about 65 or 70 per cent. of phenol and its homologues. It is composed of the fraction designated in the distillation of tar as "carbolic-oil," which, after certain purification, is rendered water-soluble by the addition of soap.—Pharm. Ztg., 49, No. 3 (Jan. 9, 1904), 27.

Anterin is the name given to a snuff which is said to contain cocaine and boric acid.

Antisclerosin is the name given to tablets introduced as a substitute for Trunczek's serum, 25 of them containing 10 Gm. sodium chloride, 1 Gm. sodium sulphate, 0.4 Gm. sodium carbonate, 0.4 Gm. magnesium phosphate, 0.3 Gm. sodium phosphate, and 1 Gm. calcium glycerophosphate. Two of these tablets have a saline content corresponding to 150 Cc. of blood serum, and 2 to 4 of them are given once or twice daily in calcareous formation of the blood and in nervous affections.—Pharm. Ztg., 48, No. 65 (Aug. 15, 1903), 655.

Antiseptiform is the name given to an English disinfectant product containing formaldehyde.

Aphor is the name given by Dr. M. Fisch to the material prepared in the form of tablets for carbonic acid baths, which is supplied in 20 different strengths. Each dose is composed of two tablets, the one round, containing sodium bicarbonate; the other square, varying in composition according to the kind of both desired, but containing an acid salt, (presumably potassium bisulphate) for the liberation of the carbonic acid from the soda tablet.—D. Aertzte Ztg., 1903, No. 16.

Arbor Oil is the name given to a specialty, which is claimed to be a natural product containing various cresols, phenols, anthracenes, etc. It is recommended for topical application, mixed with an equal volume of ether, in the most varied skin diseases, and also in rheumatism and neuralgia.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 137.

Arhovin is the name given to the addition product of diphenylamine and thymyl-benzoic acid esterized with ethyl alcohol. The odor of this compound is aromatic, but its taste burning, and it can therefore only be administered in the form of capsules. Its sp. gr. is 1.055; b. p., 218, and while soluble in alcohol, ether and chloroform, it is insoluble in water. It is given in gonorrhœa in doses of 0.25 Gm. several times daily, being in its passage through the bladder converted into hippuric acid phenyl ester.—Pharm. Ztg., 48, No. 100 (Dec. 16, 1903), 1012.

Aristoquin is the trade-name of a "tasteless" derivative of quinine—chemically a diquinine-ester—which, according to preliminary clinical experiments, promises to become a very useful quinine preparation for children.—Bull. Pharm., Aug., 1903, 347.

Arrhénal Lithium is the name by which it is proposed to designate the lithium substitution product of arrhénal (methyl arsenate of sodium). It is described by Labadie-Lagrave as chlorhydromethyl arsenate of lithium $[\text{CH}_3\text{AsHCl}(\text{LiO})_2\text{O}]$, and has the advantage over the methyl arsenate and the cacodyl compounds in its greater stability, in consequence of which it is not decomposed in the digestive tract. It is given in form of aqueous solution containing 0.04 Gm. of chlorhydromethyl arsenic acid in each cubic centimeter, the dose being 5 to 10 drops, but may also be given in pill form.—Nouv. Reméd., 1903, No. 23.

Arsen-Ferratin is a red powder containing 7 per cent. of iron and 0.06 per cent. of arsenous acid, marketed by the same firm that introduced "ferratin."—Pharm. Ztg., 48, No. 76 (Sept. 23, 1903), 774.

Autoplast is the name given to a collodium-like specialty, for which healing and antiseptic properties are claimed. It is recommended in cases of burns and as a covering for wounds, etc.—Pharm. Ztg., 49, No. 27 (April 2, 1904), 282.

Autorin is the name given to a German specialty recommended as a perspiration deodorant composed of 10 p. boric acid, 3 p. tartaric acid,

1 p. oil of wintergreen, 2 p. artificial fruit essence, and 84 p. spirit of rose.—“The Apothecary,” Febr., 1904, 95.

Benesol is the name given to a Spanish specialty recommended as a local anæsthetic, which is said to contain principally cocain and eucaïn β , with menthol, phenol, eucalyptol, and amylnitrite, dissolved in sterilized distilled water.—Wien. Med. Pr., 1904, No. 7.

Bioson is the name given to an albuminoid nutrient specialty recommended as an addition to other foods, such as milk, bouillon, etc., in doses of 30 to 50 Gm. daily. It is prepared from casein, contains 0.24 per cent. of iron and 1.2 per cent. of lecithin, and is supplied in form of a gray-brown powder, not unpleasant to the taste, which is completely soluble in watery fluids.—Berl. klin. Wschr., 1904, No. 22.

Bismutum-colloidal is the name given to a peculiar combination of sodium lysalbinat and protalbinat with bismuth metahydroxide, the exact chemical nature of which is not yet understood. It contains 20 per cent. of metallic bismuth, and is freely soluble in water, its solutions being yellowish-red, faintly opalescent, tasteless and comparatively mobile up to 25 per cent., while the stronger solutions up to 50 per cent. are syrupy to gelatinous in consistence. This colloidal form of bismuth is recommended by Kinner in place of the insoluble bismuth preparations in common use in acute indigestion of nursing infants, being a non-irritant, easily administered and readily absorbable bismuth compound. It is administered in the form of a 10 per cent. solution in doses of 5 Cc. with milk or other liquid foods, three to four times daily.—Münch. Med. Wschr., 1903, No. 29.

Bituminol is the name of another ichthyol substitute, designated as being ammonium sulphobituminolicum.

Bob-Delicatesse is the name given by an enterprising apothecary of Buda-Pest to a purgative remedy consisting of a dried fruit (kind not stated) freed from seed, candicol, and evidently impregnated with some purgative substance which produces a certain, but mild and painless evacuation.—Pharm. Ztg., 48, No. 76 (Sept. 23, 1903), 774.

Borated Suprarenin is supplied in form of tablets, which, however, contain a certain amount of cocaine. Each tablet is claimed to contain 0.00013 Gm. borated suprarenin, 0.01 Gm. cocaine, and 0.009 Gm. sodium chloride. The borated suprarenin contains 1 part of pure suprarenin and 0.3 parts boric acid.—Pharm. Ztg., 49, No. 50 (June 22, 1904), 527.

Bornylal is the name given to the bornyl ester of isovalerianic acid, the preponderating constituent of oil of valerian. It is characterized by the rapidity with which it acquires acidity, particularly in the presence of water, this being the result of hydrolytic action.—Pharm. Ztg., 49, No. 4 (Jan. 13, 1904), 41.

Butter-milk Conserve is the name given to an infant food, the preparation of which has until recently been withheld, but is now communicated by T. Selter and Rensburg. According to Wörner it yields with 3 parts of water a butter-milk containing 2.59 per cent. of egg-white (with 0.44 albumen) ; 0.5 per cent. fat ; 8.3 per cent. sugar (6 per cent. saccharose and 2.3 per cent. lactose) ; 0.5 per cent. lactic acid ; 0.06 per cent. CaO ; 0.15 per cent. P₂O₅ ; and yields 0.58 per cent. of ash.—D. Med. Wochr., 1903, No. 27.

Cacaoline is the name given to a substance advertised as a substitute for cacao butter. Analysis, however, appears to show that it is virtually nothing but cacao butter.—Nat. Drugg., Jan., 1904, 13.

Caffeol Pastilles are tablets containing an extract prepared from coffee-husks by a special process and rendered agreeably acid and thirst-quenching by the addition of a certain quantity of malic acid. They are recommended as a tonic and refrigerant remedy.—Pharm. Ztg., 48, No. 94 (Nov. 25, 1903), 953.

Castoreum-Bromid is the name given to an effervescent salt containing valerian and castor in combination with bromides. It is given in affections for which its components are usually given, in doses of one-half to one measuring glass (6.0 Gm. capacity) 2 or 3 times daily.—Pharm. Ztg., 48, No. 102 (Dec. 23, 1903), 1036.

Cellotropin is the name given to "monobenzoyl-arbutin" and is obtained by the action of benzoyl chloride on arbutin in neutral solution, the reaction being in accordance with the following equation : $C_{12}H_{16}O_7 + C_7H_5OCl = C_{19}H_{20}O_8 + HCl$. It is obtained in form of a white, crystalline, tasteless and odorless powder, requiring 1300 p. of water at 15° for solution, but only 80 p. at 100° ; readily soluble in alcohol, but insoluble in ether, benzol and chloroform. Its aqueous solutions are neutral. Cellotropin is intended for therapeutic use in various infectious diseases, particularly tuberculosis and scrofula ; is claimed to be perfectly non-toxic, and its use, in doses of 0.3 to 0.5 Gm., thrice daily, to be unattended by unpleasant secondary effects.—Pharm. Ztg., 49, No. 26 (March 30, 1904), 272.

Cerolin is the name given by E. Roos and O. Hinsberg to a fatty substance obtained from yeast, to which they attribute specific purgative properties. It is obtained from the dried yeast to the amount of about 3 per cent. by extraction with alcohol, and is mainly composed of a neutral fat, with only small quantities of free fatty acids, together with a little cholesterine and volatile oil. The alcoholic extract is dissolved in warm soda solution, the solution shaken out with ether, and the alkaline-aqueous liquid precipitated with calcium chloride solution. A voluminous precipitate is produced, which is collected on a filter, washed and dried. The calcium compound so formed contains only small quantities of cal-

cium carbonate. Given in pill form, in doses of 0.1 Gm., it has been proven to produce purgation in 15 or 16 cases in which it was tried, whilst the filtrate from which the calcium compound had been separated, had no such effect, or at most only faint indications.—Münch. Med. Wschr., 1903, No. 28.

Chresylatin is the name given by L. Palmans to a dark-brown, oily, alkaline fluid, having a strong aromatic odor, which contains besides resin-soaps, naphthalin and cresol, and is evidently obtained by treating certain portions of coal tar, rich in naphthalin and cresol, with the soaps mentioned. It has a sp. gr. of 1.016. Experiments made seem to show that it possesses powerful antiseptic and disinfectant properties, and that it is apparently well adapted as an economical substitute for carbolic acid for many purposes, over which it possesses the advantage of a more pleasant odor and freedom from corrosive action.—Chem. Centralbl., 1903, II., No. 2.

Chinoformin is the name given by Adrian and Trillat to a compound of hexamethylene tetramine (formin) with quinic acid, recommended in various forms of gout, rheumatism, etc., and apparently a very similar preparation to the product known in Germany by the name of

Chinotropin, which is also a compound of quinic acid and urotropin (formin).—Pharm. Ztg., 48, No. 65 (Aug. 15, 1903), 655.

Chrysoform is the name given to di-bromo-di-iodo-hexamethylene tetramine, which is recommended as an iodoform substitute in veterinary practice. It is supplied in form of a fine, yellow powder, of faint iodine-like odor, and is insoluble in water and alcohol.—Pharm. Centralh., 1903, 911.

Citrovanille is the name given to a specialty recommended for migraine, headache, toothache, etc., which is said to contain *phenyl-dimethyl-dimethylamine*-pyrazolon citrate, with aromatics to correct the taste of the preparation.—Pharm. Ztg., 48, No. 87 (Oct. 31, 1903), 883.

Citrozon is the name given to an effervescent vanadium compound introduced under the name of "*Nervol*," which see.

Convulsin is the name given to a fluid extract of eucalyptus leaves prepared under a special process, which is flavored with vanilla, and is recommended as an efficient remedy in cough, whooping-cough and other affections of the respiratory organs. In severe cases it is given in doses of a tablespoonful to adults every hour, which can subsequently be reduced in dose and frequency. Pharm. Ztg., 49, No. 51 (June 25, 1904), 536.

Cornutinum Citricum is a preparation of ergot introduced by Kobert and used as a substitute for the usual preparations of ergot, over which it is claimed to possess certain advantages. It is supplied in sterilized solution enclosed in sealed tubes.—Pharm. Ztg., 49, No. 34 (April 27, 1904), 356.

Contratussin is the name of a Hungarian specialty similar to "Per-tussin" (which see), recommended as a remedy for whooping-cough.—Pharm. Ztg., 49, No. 33 (April 23, 1904), 344.

Cotargit is the name given to a double salt of cotarnine hydrochloride and ferric chloride, supplied in form of ruby-red crystals, melting at 104°–105°, and recommended as a hæmostatic.—Pharm. Ztg., 49, No. 47 (June 11, 1904), 494.

Creolin Substitutes are recommended by E. Baroni to be prepared by pharmacists according to the following formula: Venice turpentine, 250 Gm.; liquor sodæ, sp. gr. 1.332, 70 Gm.; tar oil, sp. gr. 1.030 to 1.035, 775 Gm. Saponify the turpentine with the caustic soda at 100° C., evaporate the soap solution to about 300 Gm., and add the tar oil previously heated to 70° or 80°. The mixture is stirred continuously and the heat maintained at 100° until a permanent pellicle forms on the surface. The product is then filtered, the yield being about 1020 to 1025 Gm., while the entire process does not consume more than 30 to 40 minutes. The tar oil used by the author was a reddish-black fluid of sp. gr. 1.030, boiling from 160°–275°, and containing 22 per cent. of phenols. The creolin substitute obtained with this tar oil was of a black color in mass, reddish in thin layers, of sp. gr. 1.044, and yielded with water a permanent, milk-white and alkaline emulsion.—Pharm. Ztg., 49, No. 9 (Jan. 30, 1904), 91.

Creosotide is the name given to a compound of iodine with creosol, guaiacol and other phenols of beechwood creosote, containing approximately 25 per cent. of iodine, and recommended in the treatment of cases in which iodine is usually prescribed. It has proved of value in glandular enlargements, scrofulous affections, chronic bronchial affections, asthma and tuberculosis, and has also been prescribed as an intestinal antiseptic. It is supplied in form of an amorphous brownish powder.—Bull. Pharm., July, 1903, 303.

Cyllin is the name given to a creosol preparation which is designed to be stronger than the product hitherto supplied under the name of "creolin."

Derivol is the name given to a specialty recommended as an antirheumatic which consists, according to the manufacturers, of mustard oil, oil of turpentine, and ammonium chloride.—Bull. Pharm., Jan., 1904, 39.

Dermalin is the name given to an ointment which, according to Dr. Aufrecht, consists essentially of a mixture of pure woolfat and some other animal fat. It is free from glycerin and other substances, and will take up almost 135 per cent. of its weight of water without losing its ointment-like consistence.—Bull. Pharm., March, 1904.

Dermocrucin is the name of a salve containing 50 per cent. of the

mother liquor of Krenznach salt.—Pharm. Ztg., 49, No. 34 (April 27, 1904), 356.

Dialysatum Equiseti is the name given by A. Breitenstein to a preparation of *Equisetum arvense*, which is recommended as an efficient diuretic in doses of 30 drops, administered every two hours.—Therap. Monatsh., 1904, No. 5.

Diastasin Preparations are Austrian specialties containing diastase, albumins and malt extract.

Duralcol is the name given to bandages of various combinations of "alcohol-cellit" (which see) with opodeldoc, ichthyol, etc., to be used similarly to the salve mull bandages, by applying it in slices and covering with an impervious fabric, such as Billroth-battist, gutta-percha paper, etc. It is supplied in sheets enclosed in air-tight tin containers, and is thus preservable for some time.—Pharm. Ztg., 48, No. 59 (July 25, 1903), 594.

Dysenterietoxin is a toxin prepared by L. Rosenthal from Bouillon cultures in a similar manner to diphtheria antitoxin. This toxin appears to possess considerable resistance to heat and reagents. While heating to 70°–100° diminishes its activity, it does not destroy it. Alcohol produces a whitish flocculent precipitate, which may be redissolved in physiological salt solution and retains its toxicity unimpaired. Nothing is mentioned concerning clinical experiments or experience with the new toxin.—D. Med. Wschr., 1904, No. 7.

Dyspeptine is the name given by Dr. Kepp to the pure natural gastric juice obtained from healthy hogs by means of the Parlow stomach-fistula. The product is sterilized without addition of any kind and preserved in sterilized bottles in a cool place. In disturbances of the digestive functions it is given in doses of two to three tablespoonfuls after each meal, eventually reducing the dose to one tablespoonful.—Pharm. Ztg., 48, No. 99 (Dec. 12, 1903), 1001.

Elchina is the name given to a Swiss specialty, claiming to be a stronger elixir of cinchona, containing 0.32 per cent. of quinine, 2 per cent. of sodium glycerophosphate and 1 per cent. tincture of nux vomica. It is recommended to dispense it in admixture with wine and, under circumstances, also with the addition of 3 per cent. of hydrochloric acid.—Pharm. Ztg., 49, No. 50 (June 22, 1904), 527.

Elixir "Glasser," L., is a specialty prepared from condurango bark, 25, cinchona, 25; ferri-ammonium citrate, 5; orange peel, 5; Hoffmann's elixir (? Rep.), 5; Malaga wine, 1000 parts, with certain aromatics not mentioned. It is recommended as a tonic in anæmia, but is also supplied without iron.—Pharm. Ztg., 49, No. 45 (June 4, 1904), 472.

Empyroform is the name given to a formaldehyde and tar preparation. It occurs as a dry, non-hygroscopic powder, insoluble in water, but readily dissolved by acetone, chloroform and in caustic alkalies, and has only a

faint odor, which, however, does not remind of tar. It is recommended in dermatological practice on account of its pronounced effect in allaying local irritation, particularly in eczema, for which purpose it may be applied in the form of tincture, varnish, zinc paste or salves.—Pharm. Ztg., 48, No. 54 (July 8, 1903), 544.

Empyroleum Pini is a colorless product obtained in Russia from pine tar, and intended to replace the ordinary tar preparations in use.

Emulgen is the name given by Paul Raphaël to an emulsifying agent which he describes as being a perfectly indifferent, stable and pure natural mucilage, of extract-like consistence, colorless, and containing about 18 per cent. of an adhesive substance. It is miscible with water to form a faintly turbid liquid, and easily and permanently emulsifies fixed oils by simple agitation in the proportion of 100 p. oil, 20 p. emulgen and 60 p. water.—Pharm. Ztg., 48, No. 102 (Dec. 23, 1903), 1035.

Energetines (Energetènes) is the generic name given to a new class of preparations which are claimed to represent the active constituents of certain medicinal plants in an unchanged condition, secured by treating the fresh juices without the use of either alcohol or heat. The particulars of the process are, however, not given. They are described as brownish fluids, having the odor and taste of the plant, and represent the fresh drug, grain for grain. The only drugs so far represented in these "energetines" are convallaria, colchicum, digitalis and valerian.—Bull. der Sc. Pharmacol., 1904, No. 4.

Epirenan is the name given to a specialty which is claimed to be a solution 1 : 1000 of the pure, ash-free, well-crystallized constituent of the suprarenal gland, known by the names of adronatia, suprarenin, etc. The solution is sterilized and claimed to be stable. It contains the hydrochloride of the carefully-prepared base in physiological salt solution.—Pharm. Ztg., 49, No. 13 (Feb. 13, 1904), 137.

Erasin is the name given to a specialty containing as active constituents potassium sulpho-guaiacolate and ethyl morphine hydrochloride (=dionin) in the form of a syrup.—Pharm. Ztg., 48, No. 24 (March 23, 1904), 250.

Ergotina Styptica-Egger is the name given by L. Hajos to a fluid extract of ergot containing 5 per cent. of stypticin. It is recommended for the treatment of ailments affecting the brain, in neurosis following menstrual disturbances, etc., being administered in doses of 10 to 15 drops several times daily.—Pharm. Ztg., 49, No. 27 (April 2, 1904), 282.

Ernis' Tuberculosis Remedies are supplied in form of pills and powders. The pills contain sodium cinnamylate, sodium ortho-sulpho-guaiacolate, and saccharated iron carbonate, five of them containing 1 Gm. of these active constituents and constituting a single adult dose. The powder contains in addition to the above-mentioned ingredients a little peppermint

oil, and is administered in doses of 1 to 2 Gm.—Pharm. Ztg., 48, No. 79 (Oct. 3, 1903), 804.

Esanofelin is the name given to a specialty recommended for the treatment of malaria in children, which is supplied in three potencies, and contains according to "Pharm. Centralh.," hydrochloride of quinine, ferric citrate, and arsenous acid.

Ester-Dermasan is the name given to a specialty composed of a 10 per cent. salicylic acid soap, fortified with 10 per cent. of salicylic esters, having benzyl-phenyl radicals. It is supplied in two modifications, the second one being intended for veterinary uses.—Pharm. Ztg., 48, No. 76 (Sept. 23, 1904), 774.

Euguformum Solubile is a 50 per cent. solution of "euguform" in acetone, which, like dry euguform, is employed in form of pastes or salves, or also by itself, undiluted.—D. Med. Woch., 1904, No. 4.

Eumydrin is the name given to a non-mydriatic, "atropine methyl nitrate," which is supplied in the form of a white, odorless powder, readily soluble in water. With its toxicity reduced to about one-fiftieth of that of atropine, its mydriatic effect is intermediate with that of the customary 1 per cent. solution of homatropine and atropine, and in stronger solutions it very nearly reaches the activity of the latter.—Berl. Klin. Wschr., 1903, No. 47.

Euporphin is the name given to "methyl-apomorphine bromide," which is recommended as a non-toxic substitute for apomorphine hydrochloride. It forms colorless needles or scales, melting at 180°, readily soluble in water and alcohol, and forming with water a solution which is far more resistant to the influence of light and air than is apomorphine hydrochloride, over which also numerous other advantages are claimed by its manufacturers.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 386.

Euporphin is, according to Michaelis, given with advantage, combined with small doses of morphine, in the treatment of acute and chronic bronchitis, asthma, pneumonia and occasionally also in phthisis. The dose is 0.01 to 0.04 Gm.—Pharm. Ztg., 49, No. 47 (June 11, 1904), 494.

Eusemin is the name given to a preparation to be used as an anæsthetic injection in dental practice, which is essentially composed of cocaine and suprarenal extract.—Pharm. Ztg., 49, No. 45 (June 4, 1904), 472.

Exodin—not to be confused with "exodyne"—is the name given by W. Ebstein to "diacetyl-rufigallic acid"—tetramethyl ether, which has been proven to possess active purgative properties. It is a derivative of oxyanthraquinone, and as such is nearly allied to emodin and the "purgative" of Knoll & Co. Exodin is a yellow powder, melting at 180° to 190°, insoluble in water, sparingly in alcohol, odorless and tasteless. It is supplied in 0.5 Gm. tablets, of which 2 or 3 produce evacuations in from 8 to 12 hours.—D. Med. Wschr., 1904, No. 1.

Exudol is the name given to an agreeably odorous unctuous mass, which is easily applied by inunction and readily removed by water. It is composed of ichthyol and soft soap, with addition of unnamed analgesic drugs, and is recommended to be applied to the affected parts twice in a day, and after two to four days again removed with lukewarm water or washing with alcohol.—Pharm. Ztg., 48, No. 63 (Aug. 8, 1903), 637.

Fascol is the name given to a bituminous mineral which is composed of 46.5 per cent. of calcium oxide, 41.56 per cent. carbonic acid, 1.09 per cent. ferrous oxide, 0.74 per cent. silica, and bitumen containing both nitrogen and sulphur. It is used for the preparation of a specialty introduced as

Fascol-Hæmorrhoidal Capsules, which are gelatin capsules containing a mass composed of: Wool fat, 5.65; marshmallow ointment, 8.2; olive oil, 0.1; resorcin, 0.45; bismuth sub-gallate, 0.3; powdered senna, 0.45; and fascol, 14.4. These capsules are introduced as far as possible into the rectum, where they melt, and their contents exert their activity.—Pharm. Ztg., 48, No. 85 (Oct. 24, 1903), 865.

Ferissol is the name given to a specialty claimed to be composed of cinnamic acid and guaiacol. It is supplied in form of a readily soluble powder, which is recommended in doses of 1 Gm.—Pharm. Centralh.

Fermanglobin is the name given by Squire & Sons, London, to a neutral combination of hæmoglobin, iron and manganese, in which the albuminoids are predigested. It is supplied also in combination with nux vomica or with sodium cacodylate.—Pharm. Ztg., 48, No. 72 (Sept. 9, 1903), 735.

Fetron is the name given to a new ointment base, which is stated to be composed of yellow vaseline and a dazzling-white crystalline body called "stearic acid anilide," soluble in ether, alcohol, chloroform, benzin, benzol, carbon bisulphide, etc., with more or less facility. The new ointment base is characterized and differentiated by firmer consistence and pronouncedly superior absorptive properties from the ordinary vaseline ointment base.—Apoth. Ztg., 19, No. 28 (April 6, 1904), 234.

Floricin is a castor oil product obtained by distillation at 300° under conditions explained in a German patent, intended mainly for technical purposes, but useful also as a basis for ointments. It is a yellowish-brown fluorescent body, of about the original consistence of the oil, but having properties just the reverse of those of the original oil. It is no longer soluble in alcohol, but is soluble and miscible in all proportions with mineral oils, and consequently with petroleum ether, paraffin oil, etc. It takes up large quantities of water, forming salve-like masses, and it readily forms emulsions with water alone.—Ber. d. D. Pharm. Ges., 1904, No. 3.

Fomitin is the name given to a specialty recommended for bladder, menstrual and hæmorrhoidal ailments. It is said to be a fluid extract prepared from two species of fungus—*Fomes cinnamomeus* and *Fomes igna-*

rius, which are found on various species of *Prunus*.—D. Med. Wschr., 1903, No. 43.

Frostin-Balsam is the name given to a solution of 1 p. of "tannobromin" (which see) in 10 p. of a 4 per cent. collodion, to which 1 p. alcohol and 0.5 p. tincture of benzoin are added. It is recommended to be applied by penciling to frost bites, but not to open wounds, for which a

Frostin-Salve, containing 10 per cent. of bromocoll-resorbin is recommended.—Pharm. Ztg., 48, No. 99 (Dec. 12, 1903), 1001.

Fructol is the name given to a preservative which is intended and recommended to replace alcohol and salicylic acid as preservatives for fruit juices. An examination made by Dr. R. Hoffmann, to whom a sample was submitted for this purpose, shows it to be a light-brown liquid containing from 12.5 to 13 per cent. of formic acid, together with a little sulphuric acid and an organic substance, apparently sugar. Dr. Hoffmann has also examined another fruit preservative, supplied under the name of

Werderol, which, like "fructol," owes its preservative qualities apparently to formic acid. Its acidity is estimated at 14.07 per cent., probably chiefly due to that acid. Werderol is a reddish-colored liquid, having a raspberry and prickly acidulous odor. The small quantity supplied precluded a positive recognition of its constituents. The author also has made some experiments with solutions of *formic acid*, corresponding in strength to that apparently present in these two preservatives, in order to determine their possible value as well as of the formic acid, as preservatives for fruit juices. These have so far been favorable, but not conclusive, and will be continued when fresh fruits are again obtainable.—Apoth. Ztg., 19, No. 10 (Febr. 3, 1904), 78.

Fucol is the name given by K. F. Töllner to a cod-liver oil substitute which he obtains by the extraction of sea-algæ, which have been previously washed, by extracting them with vegetable fixed oils. The author gives the chemical constants of such an oil, and an extremely favorable description of its advantages over the oil which it is intended to substitute, in point of agreeable taste as well as therapeutic efficiency, but one looks in vain for a description of its components or the nature of the vegetable oil used.—Pharm. Ztg., 49, No. 7 (Jan. 23, 1904), 69.

Gastricin is the name given to a specialty recommended for stomach disturbance, which is composed of ammonium carbonate, 1.0; ammon. chlor., 1.0; pot. bitart., 6.0; sodium and pot. tart., 2.0; crab's eyes, 5.0; magnes. carbon., 3.0; magnes. citr., 10.0; magnes. lact., 5.0; sodium chlor., 3.0; sodium sulph., 3.0; sodium bicarbonate, 60.0.—Klin. Therap. Wschr., 1903.

Glycosal is the name given to the monosalicylic ester of glycerin, which occurs as a white powder, soluble in 100 p. of cold water and freely sol-

uble in alcohol. It has proven useful in numerous cases of cystitis, having regularly an anti-fermentive action on the contents of the bladder. It is given in daily quantities of 3 to 6 Gm.—Bull. Pharm., March, 1904.

Guatannin is the name given to a condensation product of guaiacol, tannin and cinnamic acids, which is recommended and used in affections of the respiratory passages in doses of 0.05 Gm. It is soluble in alkalis, and may be separated from such solutions by acids. It is also soluble in pyridine, with which it forms a crystalline compound, crystallizing in superb rhombic needles.—Bull. Pharm., July, 1903, 303.

Guderin is the name now given by Gude & Co. to their solution of peptonate of iron and manganese. It is claimed to contain 0.4 per cent. iron, 0.1 per cent. manganese, about 4.5 per cent. albuminoids, 5 per cent. sugar, 10 per cent. wine, together with water, alcohol, glycerin and aromatics.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 137.

Gurmin is the name given to a serum for the cure of glanders in horses obtained from the blood of horses inoculated with the glanders-streptococcus. This "glanders-serum" has been found very efficient both as a protective and a cure for glanders.—Pharm. Ztg., 48, No. 81 (Oct. 10, 1903), 827.

Hæman is the name given to a specialty represented as a solution of sulphocyanide of iron in form of peptonate. The preparation was suggested as being possibly useful in anæmic and gouty conditions, it having been observed in such that according to the degree of the ailment the sulphocyanide content of the saliva is diminished or disappears completely. It is claimed for this preparation that clinical experiments have confirmed its value in the treatment of such cases.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 137.

Hæmatin-Albumin is a specialty prepared from the blood of oxen and hogs, coagulated by a special process, after the salts and extractive substance have been removed and any micro-organisms present have been destroyed. It is a brownish, odorless and tasteless powder, insoluble in water.—Pharm. Ztg., 49, No. 31 (April 16, 1904), 520.

"*Hæmatoffa*" (*Hæmatogen Cakes*) are layer cakes enclosing between the layers certain definite quantities (0.5 Gm.) of hæmatogen, sufficient for a dose. These can be eaten without repugnance by persons who object to the insipid and unpleasant taste of hæmatogen by itself, and possess, in addition, valuable nutrient qualities due to the material from which the cakes are made.

Hæmoprotagon is the name given to a compound in tablet form, prepared from and uniting the therapeutic activities of lecithin and hæmoglobin.—Pharm. Ztg., 49, No. 8 (Jan. 27, 1904), 82.

Hardiella is the name given to a cattle-wash and disinfecting agent, said to represent a cresol soap solution.

Helfin is the name given to a tænifuge supplied in form of capsules containing the necessary quantity of fresh extract of male fern (4 Gm.), mixed with castor oil (8 Gm.), for a treatment, and besides these, divided in 11 capsules, 3 Gm. oil of turpentine and 30 Gm. of castor oil.—Pharm. Ztg., 48, No. 15 (Feb., 20, 1904), 156.

Helmitol is the name given to a new compound of hexamethylene tetramine with anhydro-methylene citric acid, forming colorless needles. It is said to be more effective than hexamethylene tetramine because the methylene group is easily split off, and appears in the urine as formaldehyde. It is sparingly soluble in alcohol and ether, but soluble to the amount of 7 per cent. in water.—Bull. Pharm., July, 1903, 303.

Hemisine is the name given by Burroughs, Wellcome & Co. to the active constituent of the suprarenal gland, having the composition in the chemically pure state of $C_9H_{13}O_3N$, and being identified with the substances described under the names of adrenalin, epinephrin, epirenan and suprenin.—Pharm. Ztg., 49, No. 27 (April 2, 1904), 282.

Heritin is the name given to a product obtained by injecting the poisonous alkaloidal constituent of *Heritiera javanica*, a highly poisonous plant indigenous to the Sunda Islands, into the veins of animals (rabbits) in gradually increased doses, until the animal is rendered immune, and then collecting the serum in the usual manner. From this the remedy is separated by a method not explained. It is claimed to be an efficient remedy in migraine and nervous headaches, in epilepsy, chorea, etc.—Pharm. Ztg., 49, No. 34 (April 27, 1904), 356.

Hetralin is the name given to "dioxybenzol-hexamethylen-tetramine," a white body, crystallizing in needles, soluble in 4 parts of hot, or 14 parts of cold water, stable in composition under ordinary exposure to air, but decomposed when heated above 160° C. It is non-toxic and is recommended as a specific in *cystitis gonorrhoeica*, and as a substitute for urotropin in the same doses (1–1.5 Gm.) per day.—Pharm. Ztg., Aug. 8, 1903, 637.

Hirudin is the name given by its manufacturers to the active principle of leeches, which causes the coagulation of blood. It was originally designated by its discoverer, Franz, as "herudin."—Pharm. Ztg., 48, No. 59 (July 25, 1903), 594.

Hopogan is the generic name given to a line of preparations—pastilles and powders—consisting mainly of magnesium peroxide and sugar, and recommended as remedies in headache, chlorosis, anæmia, etc.—Bull. Pharm., July, 1903, 303.

Hydrargyrum Anilanicum is recommended by Fedtschenks for the treatment of syphilis, both in form of salve and as injection—the latter composed of hyd. anil., 4.0; cocaine nitr., 0.25; ol. vaselin, 30.0.—D. Med. Wschr., 1904, No. 17.

Hydrargyrum Anilanicum is described as a light, white powder, composed of microscopic needle-shaped crystals having the formula $\text{Hg}(\text{C}_6\text{H}_4\text{NH}_2)_2$, and, containing 52.1 per cent. of mercury, is superior in that respect to mercuric benzoate. It is odorless, tasteless, and insoluble in water.—*Russki Wratch.*, 1904, 3, 445.

Iatrevin is the name given to a condensation-product of menthcamphor and butyl-phenol, which appears as a light, clear liquid, having an odor reminding of peppermint. It is easily soluble in alcohol, but with difficulty in water and ether. It is a disinfectant, equal in power to phenol, useful in the treatment of acute and chronic catarrhs of the upper air-passages, especially in tuberculous cases, when sprayings of 2.5 per cent. to 5 per cent. solutions are employed. It is also now being employed as an inhalant in tuberculosis.—*Nat. Drugg.*, Jan., 1904, 13.

Ichden is the name given to a Swiss ichthyol-substitute, which is claimed to be in every respect the equivalent of ichthyol.—*Pharm. Ztg.*, 49, No. 51 (June 25, 1904), 536.

Iodipin.—*Substitute*.—According to Schwank a preparation corresponding in its characters to the protected "iodipin," may be obtained as follows: 20 Gm. of rape oil are mixed with a solution of 2 Gm. of iodine in ether, and the mixture heated until the ether is evaporated. Chlorine is then passed through the mixture, the excess of Cl driven off by heat, and the product is then washed with water until the washings cease to give a precipitate with silver nitrate. Iodipin is prepared with benne oil, but the author considers the rape oil the more suitable.—*Rep. de Pharm.*, 1904, No. 2.

Iodoformaniline is a solution of iodoform in aniline oil, in the proportion of 1 : 7, recommended by A. Gray in catarrhal affections of the ear. It is applied on a cotton-dabber moistened with 5 drops of the liquid and held in the ear—by the physician—for five minutes, this treatment being repeated two or three times in the week.—*Pharm. Ztg.*, 48, No. 79 (Oct. 3, 1903), 805.

Iodosyl is the name given to a substitute for iodoform, which is claimed to contain a little over 65 per cent. of iodine in chemical combination. It is supplied in the form of a bulky, amorphous garnet-red powder, and has been found useful in ophthalmology, rhinology, otology, gynecology and general surgery.—*Bull. Pharm.*, Jan., 1904, 39.

Iodterpin is obtained, according to Mas and Guindal, by gently heating equal quantities of iodine and terpin hydrate, triturated as fine as possible on a water-bath. The product has the consistence, color and general appearance of ichthyol, and an odor of terpin hydrate, but not reminding of iodine. The taste is somewhat aromatic; sp. gr., at 15°, 1.190; boiling-point, 165° to 175° C. It is miscible with water, and soluble in alcohol, ether, petroleum ether, chloroform and benzol. Therapeutically it is

recommended as a substitute for iodoform, applied as ointment, or, by admixture with 20 per cent. of sterilized kaolin, it may be used as dusting powder.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 386.

Iothion is the name given to a yellowish-brown, syrupy fluid, heavier than water, and composed of benne oil, iodine and sulphur. It is supplied in two strengths, the one containing 10 per cent. iodine and 1.6 per cent. of sulphur, the other 25 per cent. iodine and 2.5 per cent. of sulphur, these elements being chemically united. Iothion is recommended both for internal administration and for subcutaneous injections.—Monatsh. f. pr. Derm.; Pharm. Ztg., 49, No. 50 (June 22, 1904), 527.

Isopral is the name given by Impens to trichlor-isopropyl-alcohol, and is recommended as hypnotic, possessing the advantage over chloral hydrate in being less toxic and twice as active. It occurs in well-formed macroscopic prisms, melting at 49° C., and readily subliming at the ordinary temperature; is soluble in 3.35 parts of water at 19° C., and readily soluble in alcohol and ether. It has a camphoraceous odor, and an aromatic, somewhat prickling taste, producing a burning sensation on the tongue, even followed by pronounced anaesthesia.—Ther. Monatsh., 1903, No. 9.

Jathievin is the name given to a condensation product of menthol-camphor and isobutyl phenol. It is a light-colored, clear liquid, of aromatic, mint-like odor, readily soluble in alcohol, but more difficultly in water and ether. It is used for inhalations in acute or chronic catarrhal affections of the respiratory organs, by nebulizing its 2.5 to 5.0 per cent. solutions.—Allg. Med. Zents. Ztg., 1903.

Jecorol is the name given to a Swiss chocolate emulsion of cod-liver oil, which in common with modern practice, is supplied in various modifications, such as—

Jecorol guaiacolate, containing 20 per cent. guaiacol carbonate;

Jecorol iodate, containing 10 per cent. of "iodipin," and

Jecorol lecithinate, containing 0.6 per cent. of lecithin.—Pharm. Ztg., 48, No. 93 (Dec. 9, 1903), 993.

Kalodal is the name of an albuminoid specialty, recommended as a valuable nutrient, which is administered by injection, both subcutaneously and per rectum. It is said to be prepared from meat and to contain 95 per cent. of easily soluble and readily assimilable albuminoids, together with small quantities of saline constituents, notably phosphates, traces of iron, and 0.2 per cent. of sodium chloride. Kalodal is a light yellowish-brown powder, readily soluble in water, odorless and tasteless. The solution may be made with physiological salt solution, normal or dilute, or even with water alone. Hot water (at 50°–60°) being placed in a beaker, 5 Gm. of kalodal is poured on the surface, and allowed to stand until dissolved, which requires about half an hour. The solution is filtered twice,

sterilized, and may then be administered direct per rectum, or subcutaneously, as may be indicated.—Münch. Med. Wschr., 1904, No. 9.

Kamakosin is the name given to a tape-worm remedy composed, as may be inferred from the coined name, essentially of kamala and kousso, or their active constituents.—Pharm. Ztg., 49, No. 51 (June 25, 1904), 536.

Kastanol is the name given to an extract representing the active constituents of horse chestnuts, *æsculus hippocastanum*, and containing 8 per cent. of camphor, which is recommended as an analgesic in rheumatic and gouty affections, frost-bites, etc., as embrocation and for pencilling.—Pharm. Ztg., 48, No. 83 (Oct. 17, 1903), 815.

Kolkodin is a specialty recommended for colic in horses, and said to be composed of 60 per cent. arsenous acid and 40 per cent. cane sugar.

Keryl is the name given to a specialty recommended for insufflations in diphtheria and in nose and throat affections of various kinds. It is a white powder, possessing antiseptic properties, and is described as being "*Acid. ortho-phenol-sulfon-borosalicylicum* with 1 per cent. of *iodol-menthol*."—Pharm. Ztg., 48, No. 82 (Oct. 14, 1903), 836.

Lactagol is described by Dr. B. Bekmann as a dry extract of cotton-seed meal, forming a fine, yellowish-white powder, not disagreeable to the taste, and insoluble in water, but readily forming a sort of emulsion with it. Given in doses of 3 to 4 heaping teaspoonfuls daily to nursing women, it was found to increase the secretion of milk decidedly, within one to four days, without disturbing the nutrition and general condition of the mother and child. Bull. Pharm., April, 1904, 172.

Lactoserum (*Blonde's Serum*) is a milk serum, obtained from cows' milk by coagulating it with acid, neutralizing the serum with soda, filtering it through a porcelain filter, and transferring it under pressure of carbonic acid into small sterilized bottles. Beside the salts of the milk and albumen the serum contains some ferments, which are, however, rendered inactive by the presence of the carbonic acid. When injected subcutaneously it reduces blood pressure with greater certainty than Trunczek's serum, for which it is recommended as a substitute. It is used in doses of 10 Cc. once or twice daily, but may be increased to daily dose of 50 to 60 Cc.—Rép. de Pharm., 1903, No. 8.

Lanesin is the name given to a preparation composed largely of lanolin and acetate of aluminium, to which several other ingredients (? Rep.) are added, and is exploited as a remedy against the effect of insect bites, preventing swelling and relieving the irritation produced in a short time. It is applied by inunction to the affected part.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 574.

Laxatol is the name given to a purgative specialty which is mainly composed of phenolphthalein.—Zschr. Oester. Apoth. Ver., 1904.

Lecith-Cerebrin is a specialty which, according to Martell, is prepared

from the brain substance, and very effective as a sedative and hypnotic in its action on the nervous system when applied in form of a salve. A second lecithin specialty is

Lecith-Medullin, which is prepared from bone-marrow, and is described as possessing diuretic properties combined with tonic action in different affections of the abdominal organs, impotence, incontinence of urine, obesity, etc.—*Münch. Med. Wschr.*, 1904, No. 12.

Lecithin-Perdynamin is the name given to a product that combines the known effects of its two components, being administered in doses of a teaspoon to a tablespoonful several times daily.—*Pharm. Ztg.*, 48, No. 60 (July 29, 1903), 604.

Levuretin is the name given to a dry yeast, which is claimed to be perfectly pure.

Liquor Ferri Riesa—Original, is a specialty containing 0.5 per cent. of iron in the form of a citro-sodium saccharate, 10 per cent. of alcohol, 14 per cent. of sugar syrup, aromatics and water. The iron compound is said to be obtained by treating freshly-precipitated ferric hydroxide with a freshly-prepared solution of sodium citrate and some sugar. The product is claimed to be stable, agreeably tasting, easily digestible and effective.—*Pharm. Ztg.*, 49, No. 24 (March 23, 1904), 250.

Liquor Triferrini Compositus is a specialty containing 1.5 per cent. of triferrin in aromatic-alcoholic solution. It is a dark brown red fluid which remains clear even when kept for many months, and is used with advantage in cases where iron is indicated in doses of a tablespoonful 3 times daily.—*Therap. Monatsh.*, 1903, No. 10.

Lithyol is the name given to a substitute for ichthyol, and is, like "ammonium sulphothylicum," of Swiss origin.

Lusarginum is another name for colloidal silver.

Maretin is the name given to a methylated acetanilid, in which the acetyl group is replaced by the group NH.NH.CONH_2 , and is chemically to be considered as a carbaminic acid—*M-tolyl hydracid*. It forms white, glistening crystals, melting at $183^\circ\text{--}184^\circ\text{C.}$, tasteless, and soluble only to the amount of 0.1 per cent. in water at the room temperature, with difficulty soluble also in chloroform and acetone, almost insoluble in ether, but soluble in 95 per cent. alcohol to the amount of about 1 per cent. It is recommended as an antipyretic, particularly in the fever of consumption, in doses of 0.2 to 0.5, and is claimed to be free from the secondary effects produced by acetanilid.—*Berl. Klin. Wschr.*, 1904, No. 23.

Marmorekin is the trade-name now given to Marmorek's anti-streptococcus serum.

Mercuria Oil is the name given to a specialty recommended for the exhibition of mercury in form of injections, in doses of $\frac{1}{20}$ to $\frac{1}{5}$ Cc. The composition is not given.—*Arch. f. Derm. u. Syph.*, 1904, 1-2.

Milk-Meat Extract is a product introduced by Dr. Eberhard which, according to Varges, is prepared from the whey of skim-milk, previously deprived of casein and milk-sugar. Beef is extracted with this whey, the liquid is clarified by boiling, etc., and evaporated to the consistence of extract. It resembles meat extract in appearance and odor, and is completely soluble in water.—Pharm. Centralh., 1903, No. 24.

Morphinum-Bismuthum Iodatum is a French specialty, analogous in composition to the double salt, cinchoninum-bismuthum iodatum, previously introduced under the name "erythrol." It is proposed to add to erythrol sufficient of this morphine double salt to produce a decided analgesic effect when the cinchonine double salt is used as a dusting powder.—Les Nouv. Reméd., 1904, No. 10.

Musin is a specialty described as a saccharated fat-albuminate of ricinus oil, and is recommended as a reliable purgative. Its composition is given as follows: Water, 17.69 per cent.; albumen, 17.05 per cent.; ether extract (fat), 55.48 per cent.; reduced sugar, 9.32 per cent.; mineral matter, 0.47 per cent.; phosphoric acid, 0.24 per cent. It should not be confounded with the tamarind purgative formerly supplied under the name of "mucin."—Pharm. Ztg., 49, No. 8 (Jan. 27, 1904), 82.

Myctogen is the name given to a derivative of beef marrow, obtained by separating the fatty matter with ether until completely freed from it. It is used in the treatment of the ears by introducing 10 drops into the external ear.—Bull. Pharm., July, 1903, 303.

Myrtilla Pastilles are recommended as an agreeable astringent remedy containing the active constituents of huckleberries, their natural tannin being combined with albumen, so that, similarly to tannate of albumen, their remedial effect is not developed until they reach the intestines. The tablets, which contain also sugar, cacao and vanilla, are found useful in the diarrhoeas and intestinal ailments of children, as well as adults.—Pharm. Ztg., 48, No. 94 (Nov. 25, 1903), 953.

Narcyl is the name given to ethylnarceine hydrochloride ($C_{25}H_{31}NO_8HCl$) which is recommended for the relief of coughs, as antispasmodic and analgesic, given in doses of 0.02 Gm. either per os or by subcutaneous injection. It crystallizes from aqueous solutions in the form of silky glistening prisms, melting at 205° – $206^{\circ}C.$; requires 120 parts of cold water for solution, more soluble in boiling water, and readily in alcohol and chloroform, but sparingly only in ether and petroleum ether. Its solubility in water is materially increased by the addition of the salts of benzoic, cinnamic and citric acid.—L'Union Pharm., 1904, No. 4.

Nervol is the name given to an effervescent vanadium preparation containing besides 10 per cent. of lithium bromide, a double salt of vanadium citrate and sodium chloride (natrium-vanadico-citro-chloratum) representing in 100 Gm. of the preparation 0.001 Gm. of vanadic acid. It is

recommended for the treatment of hysterical and neurasthenic ailments on which it exerts a quieting effect, and is given in doses of a teaspoonful dissolved in carbonic acid water, 4 or 5 times a day and before retiring at night.—D. Med. Ztg., 1903, No. 78.

Neuronal is the name given to "brom-diethyl-acetamide," which is claimed to possess powerful hypnotic action unattended by injurious secondary effects.—D. Med. Wchr., 1904, No. 22.

Nizolysol is the name given to a specialty which in its general character and properties resembles lysol, but is distinguished from the latter by the pleasant odor of its dilute solution, due to volatile oils. It is claimed that while the method of its preparation is essentially the same as that of lysol, nizolysol is prepared with specially purified cresols.—Münch. Med. Wschr., 1904, No. 7.

Nutrin is the name given to a preparation of olive oil recommended as a nutrient, and is evidently a companion-preparation to "mucin," which see. Its composition is given as follows: Water, 20.12 per cent.; albumen, 18.60 per cent.; ether extract (fat), 50.28 per cent.; reduced sugar, 9.32 per cent.; mineral matter, 0.56 per cent.; phosphoric acid, 0.27 per cent. The fat is principally composed of the oil acids, but contains small quantities of lecithin (iodine number, 104.5). Like "mucin," it replaces a former preparation—made from meat and albumen—and marketed under the same name.—Pharm. Ztg., 49, No. 8 (Jan. 27, 1904), 82.

Ononal is the trade name for a preparation supplied in form of dice-like cubes, and containing 90 per cent. of petroleum and 10 per cent. of soap.—Bull. Pharm. Jan., 1904, 39.

Ophthalmol, a Swiss specialty recommended as a specific for granulation of the eyes, is stated by F. Frank to consist simply of sterilized arachis oil.—Pharm. Ztg., 49, No. 33 (April 23, 1904), 344.

Oresol is the name given to the monoglycerinic ester of guaiacol, and is recommended in cases where guaiacol or creosote are usually indicated. It is soluble in forty volumes of water, easily soluble in alcohol, and is partially, but not completely, decomposed into its constituent elements in the digestive tract.—Bull. Pharm., July, 1903, 303.

Oxydasine is the name given to a mixture of one volume of 0.05 per cent. solution of vanadic acid and two volumes of glycerin, introduced for the convenient therapeutic use of vanadic acid.—Merck's Bericht, 1903.

Palamo Bitter Water is a Berlin specialty containing in 1000 parts the following ingredients: Magnesium sulphate, 20; sodium sulphate, 20; potassium sulphate, 0.5; sodium chloride, 20; sodium bicarbonate, 2.0; magnesium bicarbonate, 1.0; lithium bicarbonate, 0.1; free carbonic acid, 2.0 parts. It is claimed for this carbonated water that its action is

painless, its taste being greatly improved by the high CO₂ content.—Pharm. Ztg., 49, No. 51 (June 25, 1904), 536.

Paraganglin is the name given in Italy to a preparation of the suprarenal gland, which is claimed to possess an activity analogous to that of "adrenalin."—Nouv. Reméd., 1903, No. 21.

Percoll is the name given by its manufacturer to an adhesive plaster spread upon parchment paper, which is specially recommended for pressure-bandaging.—Pharm. Ztg., 48, No. 59 (July 25, 1903), 594.

Percutilan is the name given to a product obtained in wool washeries, and is recommended as being an easily absorbable ointment base.—Berl. Klin. Wschr., 1904, No. 18.

Permanent Vaginal Tampons are supplied in the form of egg-shaped (moulded) masses surrounding the tampon proper, consisting of corrosive sublimate cotton of the size of a walnut, medicated with different substances, and provided with a long silken thread protruding and extending from the gelatin mass.—Pharm. Ztg., 48, No. 59 (July 25, 1903), 594.

Perusalvin is a specialty in which balsam of Peru and various coniferous resins are combined with "salvin" (which see), and is particularly recommended for inhalations in pulmonary affections and asthma. It is a clear liquid which does not form resinous deposits when boiled with water.—Pharm. Ztg., 48, No. 82 (Oct. 14, 1903), 836.

Phenatin is the name given to purgative tablets, each containing as active constituent, 0.05 Gm. of phenolphthalein.—Pharm. Ztg., 49, No. 15 (Feb. 20, 1904), 156.

Phentozone is the name given to an antiseptic specialty recommended for inhalations in catarrhal affections. It is said to be composed of two parts each of phenol, menthol, camphor and eucalyptus oil, 1 part of lavender oil, and 52 parts of acetic acid.—L'Union Pharm., 1903.

Phthisopyrin is the name given to a preparation consisting of aspirin, arsenic and camphoric acid, and used as a remedy in consumption.—Bull. Pharm., Aug., 1903, 347.

Phytine, an organic component of numerous seeds, rich in phosphorus, is recommended by Silberschmidt as an addition to the food of nursing infants. It is added to the food in the form of a milk-sugar trituration, containing 1.5 per cent. of phytine.—Konesp.-Bl. f. Schweiz. Aertzte, 1903, 601.

Picratol is the name under which silver trinitro-phenolate is exploited as an antiseptic. It contains 30 per cent. of silver and is used like the other organic silver compounds.—"The Apothecary," Feb., 1904, 96.

Pinocaprin fluid is the name given to a specialty for external use, which has the following composition: Ol. pini silv., 10 p.; liq. ammon. caust., 10 p.; fruct. capsic. ann., 20 p.; alcohol methyl. pur., 50 p.; æther pur.,

5 p.; camphor, 3 p.; volatile oil (rosemary, lavender, thyme, etc., etc.), 2 p.—Pharm. Ztg., 49, No. 5 (Jan. 16, 1904), 49.

Piperazin Waters (*Gout Waters*), and

Phenocoll Waters (*Rheumatism Waters*), are specialties supplied of different strengths and composition to suit the different degrees of the diseases indicated.

Gout Water, I, consists of a simple solution of piperazin, 1.0, in carbonated water, 600.0, and is intended for painter's gout, kidney and bladder-gravel, etc.

Gout Water, II, contains: Piperazinum purum, 0.1; phenocollum purum, 1.0; lithium carb. purum, 0.1; aqua carb., 600.0. In acute cases, healing and relieving pain.

Gout Water, III, contains: Piperazinum purum, 1.0; lithium carb. purum, 0.1; aqua carb., 600.0. Same as I., and a preventive.

Rheumatism Water, I, is composed of phenocollum purum, 1.3; phenocollum salicylicum, 0.5; phenocollum aceticum, 0.2; aqua carb., 600.0. Recommended in mild cases of articular and muscular rheumatism, and in rheumatoid affections.

Rheumatism Water II, contains: Phenocollum purum, 2.6; phenocollum salicylicum, 1.0; phenocollum aceticum, 0.4; aqua carb., 600.0. Used in acute and chronic cases.—Pharm. Ztg., 49, No. 5 (Jan. 16, 1904), 49.

Plesioform is the name of a specialty corresponding to "thiol."

Pollantin is the name given to a serum for the prevention and cure of hay-fever, which is prepared in Germany under an American patent by introducing the pollen of certain graminaceous plants into the blood of animals, and collecting the serum in the usual manner.—Pharm. Ztg., 49, No. 3 (Jan. 9, 1903), 27.

Pollantin is distinguished from other serum preparations, in that it is intended for external application exclusively. It cannot be used subcutaneously without causing irritant and other unpleasant effects. The serum is now also supplied in the dry state as

Pollantin Powder, obtained by drying *in vacuo* and incorporating with milk-sugar. This is to be used by insufflation into the nostrils, and by the aid of a sterilized hair pencil may be introduced in the eyes in cases of hay-fever, giving the same relief in these cases as when the serum is applied in the liquid form.—Berl. Klin. Wschr., 1904, No. 11.

Prævalidin is the name given to a camphor salve which is recommended for inunctions in pulmonary tuberculosis in place of the customary camphor injections. It is composed of "percutilan" (which see), with 10 per cent. of camphor, some balsam of Peru, oil of eucalyptol and oil of rosemary.—Berl. Klin. Wschr., 1904, No. 18.

Propol is the name given to an ointment which consists of vasogen and

Propolisin, the latter, it is explained, being an antiseptic obtained by the dry distillation of the sap of the leaf-buds of certain plants. Favorable reports are made concerning its value in the treatment of wounds and cutaneous diseases, and it is also credited with analgesic properties.—Bull. Pharm., Aug., 1903, 347.

Protylin is the name given to an albuminoid containing phosphorus, which has recently been introduced as a substitute for lecithin as a tonic and nervine. It is described as a yellowish-white, nearly odorless and tasteless powder, insoluble in water, but soluble in alkalies, although in ammonia it merely swells up. It contains about 6 per cent. of PO.—Bull. Pharm., April. 1904, 172.

Prunitura is the name given to a mild aperient syrup prepared from plums, which is recommended for its efficiency and pleasant taste.—Pharm. Ztg., 49, 22 (March 16, 1904), 230.

Psoriasis Salve is a specialty composed of: Acid. salic., 10.0; chrysarobin, ol. rusc., aa 20.0; sapon. virid., vaselin, aa 25.0. It is to be applied to the affected parts by means of a bristle-brush night and morning, for 4 to 6 days, followed by daily warm baths and application of vaselin for 3 days—then, if necessary, repeating the treatment in the same way until a cure is effected. If desirable the surface, after inunction with the salve, may be covered with a light layer of starch or oxide of zinc.—Münch. Med. Wschr., 1904, No. 20.

Pyoluene is the name given to oxymethyl-allyl-sulfocarbamide, which is said to possess as strong bactericidal properties as corrosive sublimate. It is soluble in water, alcohol and glycerin, and is claimed to be non-toxic and non-corrosive.

Pyran is the name given to a compound of benzoic and salicylic acids, with thymol and a soluble sodium salt, chemically it is known as "benzoyl-sodium-thymol-oxybenzoate," and it is described as a white, rather hygroscopic, crystalline powder, having a sweetish taste and faint aromatic odor. It is soluble in 5 parts of water and 10 parts of alcohol, and is recommended as a remedy in rheumatic affections, angina, migraine, etc., in doses of 1 to 2 Gm. once to thrice daily.—Bull. Pharm., Aug., 1903, 347.

Quinaphenine is the name given to a new compound recently introduced as a superior antipyretic. It is a quinine carbonic acid phenetidid, and is obtained by the action of *p*-ethoxyphenyl carbamic acid chloride or *p*-ethoxyphenyl isocyanate on quinine, constituting a white, tasteless powder, sparingly soluble in water, but readily in acid solutions, forming salts. The sulphate forms yellow crystals, which are freely soluble in water. It is given in quantities of 1.3 to 2 Gm. daily, administered in two separate doses, in case of fever. In whooping-cough it is also found serviceable, being given to young children in dose of 0.1 to 0.2 and to older children in 0.2 to 0.3 grain doses.—Pharm. Centralh., 44, 1903, 81.

Rexolan is the name given to methylene-tannin-urea, which is recommended in the treatment of intestinal catarrh, passing the stomach undecomposed into the intestines, where it splits up with elimination of formaldehyde.—Pharm. Ztg., 49, No. 47 (June 11, 1904), 494.

Rheumon, also called "papier rheumon" and "collonin extens.," is a preparation resembling gout-paper, and recommended in rheumatism, neuralgia, etc.

Rhomnal is the name given to chemically pure nucleinic acid, which is recommended as a tonic and nervine in doses of 0.05 Gm. given 4 to 10 times a day in form of pills. It is a white or greyish-white powder, soluble in alkalies, and having the composition $C_{40}H_{51}N_{14}O_{27}P_4$.—Pharm. Ztg., 49, No. 8 (Jan. 27, 1904), 82.

Rimalin is the name given to a specialty said to be composed of extract of malt with 40 per cent. of castor oil, which is recommended in habitual constipation.—Nat. Drugg., February, 1904, 42.

Ringolinum Purum is the name given to a paste, composed of equal parts of cod-liver oil and glycerin in combination with 0.3 per cent. of zinc oxide and balsam of Peru. It is recommended for the eruptions and sores of infants, and as an ointment basis for the exhibition of such substances as tar, oil of cade, tannin, salicylic acid, sulphur, etc., etc.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 386.

Ronozol is the specific designation to indicate the various salts of diiodo-para-phenol-sulfonic acid with potassium, sodium, mercury, zinc, etc., which are specified respectively as Ronozol-K, Ronozol-N, Ronozol-H and Ronozol-Z. These compounds are said to have properties similar to the corresponding sozoiodol preparations.—Bull. Pharm., Febr., 1904.

Salibromin is the name given to the dibromsalicylic acid methyl-ester of the formula $C_6H_2Br_2OH.COCH_3$. It forms a white powder, insoluble in water, soluble in alkalies, and faintly odorous, and is recommended in doses of 0.5 Gm. four to ten times daily as an antiseptic, antipyretic and anti-rheumatic remedy.—Bull. Sc. Pharmacol., 1903, No. 6.

Salit is the name given to the salicylic acid-ester of borneol, $C_{10}H_{17}OCOC_6H_4OH$. It is an oily fluid, insoluble in water, sparingly in glycerin, but soluble and miscible in all proportions with alcohol, ether and fixed oils. When introduced into the system it splits by the action of alkalies into the components—borneol and salicylic acid. It is supplied under the name

Salitum Solutum, mixed with an equal volume of olive oil, which is used externally by penciling or as embrocation in the treatment of muscular rheumatism, acute articular rheumatism, neuralgia, etc., with good results.—Münch. Med. Wschr., 1904, No. 15.

Salocreol is the name of a specialty obtained by the action of salicylic acid on the phenols of beach tar (guaiacol, creosol, etc.). It is described as an oily, brown, almost odorless, neutral liquid, nearly insoluble in

water, but readily soluble in the various alcohols, ether and chloroform, and is stated to be free from causticity and otherwise non-toxic. It has been successfully used in rheumatism, gout, erysipelas, etc., from 3 to 20 Gm. being rubbed into the skin daily, according to circumstances.—Bull. Pharm., Jan., 1904, 39.

Salolacetamidat is the name given to a preparation analogous to "Salophen."

Saloxoin is the name given to a disinfectant bath-salt, which, it is claimed, has a powerful stimulating effect on the skin, and is otherwise a cleaner and solvent of the skin excretions.—Nat. Drugg., Feb., 1904, 42.

Saloin is the name given to a specialty composed of sage and other aromatics in alcoholic solution with rhatany, salol and glycerin, recommended for inhalations and gargles in affections of the throat and respiratory organs.

Saparaform is the name given by Beysen to a paraform soap solution, obtained by dissolving 3 or 5 per cent. of paraform in liquid potash soap—the latter being conveniently and rapidly made by shaking together 500 Gm. cocoanut oil, 330 Gm. potash solution of 40° B., and 200 Gm. of alcohol. The saponification is rapidly effected under spontaneous development of heat. The potash soap so produced has a gelatinous consistence, and must be neutralized by incorporating some oleic acid with it. It may then be used in the gelatinous condition for making a variety of compounds beside the paraform soap—menthol, thymol, creosote, camphor, etc., etc.—and dispensed in collapsible tubes. For preparing the "saparaform," it is diluted with 2000 Gm. of water, forming a 50 per cent. soap solution. The paraform seems to be present in chemical combination, but on dilution it splits off formaldehyde abundantly, and upon this property its therapeutic value is dependent. It may be perfumed by the addition of volatile oil of melissa, in the proportion of 10 or 15 drops to 1 Kgm. It forms a clear filtrate, which when diluted froths strongly.—Apoth. Ztg., 19, No. 23 (Mar. 19, 1904), 189.

Sapocresol is the name given to a cresol specialty which is claimed to be chemically identical with "lysol." It is a brownish-yellow fluid, sp. g. 1.025 to 1.060, forming a clear, neutral or faintly alkaline solution with water.

Sapocresolin, introduced by the same manufacturer, is a similar antiseptic compound resembling "creolin" in its appearance and character, and intended as a substitute for the latter. It is a neutral or faintly alkaline fluid, of a brown-black color, sp. gr. 1.02 to 1.05, and miscible with water to form milky, emulsion-like fluids.—Pharm. Ztg., 49, No. 5 (Jan. 16, 1904), 49.

Sapolentum Hydrargyri is the name of a colorless, inunction supplied in gelatin capsules, containing 33 per cent. mercurial soap, which is soluble

in water, and therefore in some respects preferable to the ordinary mercurial ointment.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 387.

Scabiol is the name given to a remedy for scabies, which is supplied in form of a red-brown, odorless fluid containing as principal constituents—storax, alcohol and soap.—Therap. Monatsh., 1903, No. 11.

Scavuline is the name given to sugar-coated pills of a bluish color, each pill containing phenolphthalein, dry extract of cascara sagrada, and compound extract of rhubarb, aa 0.05 Gm.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 387.

Sicherheit Benzin (Safety-Benzin) is the name claimed by Raum for a mixture composed of one volume of benzin and two volumes of carbon tetrachloride, which is stated to be as efficient (as a detergent) as benzin and is devoid of all its dangers.—Nat. Drugg., Febr., 1904, 42.

Siderin-Pills is the name of a German specialty having the identical composition of Blaud's pills.

Silin is the name given a specialty supplied in the form of a carbonated water, and said to be a citrosilicate of urotropine (hexamethylene tetramine). The water is recommended in the uric acid diathesis.—Pharm. Ztg., 49, No. 13 (Febr. 13, 1904), 137.

Sirsol is the name given to a specialty composed of 10.0 potassium guaiacol sulphonate, 5.0 fluid extract of orange peel, 30.0 water, and 105.0 syrup.—Pharm. Ztg., 48, No. 100 (Dec. 16, 1903), 1012.

Smaragdine is the trade name for solidified alcohol, and consists of little dice-like tablets or cubes containing alcohol and gun-cotton, and colored with malachite-green.—Bull. Pharm., Feb., 1904.

Sodium Phenylpropionate, $C_6H_5C \text{ CCOONa}$, which is distinguished from sodium cinnamate—the so-called "hetol"—by a minus of 2H, is claimed by Bulling to be superior to hetol for the treatment of laryngeal and pulmonary tuberculosis. The use of it by inhalations from 0.5 to 3.0 per cent. aqueous solutions, for half an hour, twice daily.—Münch. Med. Wschr., 1904, No. 17.

Stagnin is the name given to product obtained under described conditions from the spleen of horses, which is recommended as a hæmostatic remedy, administered subcutaneously in female complaints. It forms a yellow-brown powder, which is supplied in form of aqueous solution.—Bull. klin. Wschr., 1904, No. 22.

Stovain is the name given by F. de Lapersonne to a compound which he designates as being the "chloral hydrate of amylein *aB*," the nature and properties of which are not described. It is claimed to possess local anæsthetic action analogous to cocaine, but to be less toxic.—Bull. Commerc., 1904, No. 4.

"*Succus Valerianæ*" is the name given by Ponchet and Chevalier to a

specialty which they claim to be obtained by means of neutral solvents under the exclusion of light and air from fresh valerian root, from wild plants. This so-called juice is claimed to represent the fresh plant substance weight for weight, and to possess marked activity. The details of its preparation are, however, not given by the authors.—*Pharm. Ztg.*, 49, No. 18 (March 2, 1904), 191; from *Nouv. Reméd.*, 1904, No. 4.

Sulfammon is the name given to a specialty introduced as a substitute for ichthyol, with which it conforms in its chemical and physical characters, except that it has a less penetrant odor.

Syrupus Kali Guathymini "Lephene" is a specialty which has enjoyed local use for the treatment of catarrhal affections, as well as throat and pulmonary affections in general. It is said to be an agreeable preparation, combining the remedial properties of potassium guaiacolate with those of thyme.—*Pharm. Ztg.*, 49, Nos. 37 and 40 (May 7 and 18, 1904), 387 and 420.

Tamaquare is the name given to a liquid specialty which is said to be obtained from a Brazilian species of *Myrospermum*. It is miscible with alcohol, non-drying, and feels fatty to the touch. It is recommended for ophthalmic use in form of 3 per cent., 6 per cent., and 10 per cent. ointments, made with American vaseline.—*Pharm. Post*, 1903.

Tannobromin is the name of a bromocoll preparation prepared under a German patent, by the action of formaldehyde on dibrom-tannin. It is supplied in form of a reddish- or yellowish-gray powder, which is soluble in alcohol, contains about 25 per cent. of bromine, and has similar action to bromocoll. While it is sparingly soluble in water, it is readily soluble in alkaline solutions.—*Pharm. Ztg.*, 48, No. 99 (Dec. 12, 1903), 1001.

Tebecin is the name given to an antitoxin prepared at the Marpmann Institute, Leipzig, which is to be used in alcohol solution, given internally, for the treatment of tuberculosis. It is not suitable for subcutaneous use.—*Pharm. Ztg.*, 49, No. 13 (Feb. 13, 1904), 137.

Theocin-Sodium Acetate is a theocin compound obtained by evaporating aqueous solutions of theocin-sodium and sodium acetate to dryness, and is recommended as a superior diuretic in certain cardiac affections. It is soluble in water to the amount of 4.5 per cent., forming an alkaline solution, and contains 65.5 per cent. of theocin.—*Therap. Monatsh.*, 1904, No. 6.

Thial-Fluid is the name given to an antiseptic and disinfectant, consisting of 50 per cent. aqueous solution of formine oxymethyl-sulphonate.—*Pharm. Ztg.*, 48, No. 99 (Dec. 12, 1903), 1001.

Thienkalypol is the name given to a fumigating specialty similar to the specialty called "sanosin" (see *Proceedings* 1903), which is composed of 85 p. flowers of sulphur, 7 p. eucalyptol, and 10 p. of linden charcoal.—*Pharm. Ztg.*, 49, No. 33 (April 23, 1904), 344.

Thiol Preparations of various kinds are described, with the processes of their preparation and uses, in J. D. Riedel's Report for 1904. Among these are the aluminium, bismuth, iron, mercury, silver and zinc compounds.

Thiol-Bismuth is regarded as an epithelium-forming agent, and as such probably of therapeutic value.

Thiol-Silver is expected to prove useful in the treatment of wounds, and particularly for eczema.

Tonica Rordorf is a Swiss specialty composed of the fluid extracts of cola and cinchona, calcium and iron glycerophosphates, manganese salt, peptone, aromatic herbs and sweet wine.—Pharm. Ztg., 48, No. 65 (Aug. 15, 1903), 655.

Tonogen Suprarenale "Richter" is stated to be a preparation of the suprarenal gland of activity analogous to that of "adrenalin."—Med. Bl., 903, 35.

"*Tot*" is the trivial name given to a specialty recommended as an internal antiseptic, acting as a bactericide and absorber of gases, and useful in dyspepsia and various stomach complaints. It is a rose-colored powder, having a piquant, bitterish taste, and slightly aromatic odor, and consists of 2 p. of isonaphthol, 2 p. of benzoyl-beta-naphthol, and 1 part of abrastol (beta-naphthol-alpha-calcium sulphonate). It is supplied, mixed with vegetable charcoal, and enclosed in wafers.—Nat. Drugg., Jan., 1904, 13; from Giornale di Farmacia.

Tribérane is the name given to a French purgative which is said to contain: Senna (extracted with alcohol), 20; licorice root, 20; sugar, 70; precip. sulphur, 10; vanillin (sugar?), 2 parts.

Triferrol is the name given to an aromatic liquid preparation containing 1.5 per cent. of triferrin.

Trigemin is the phantastic name given to a compound obtained by the action of butyl-chloral-hydrate on "pyramidon" (dimethylamid antipyrine). Trigemin forms long, white needle-shaped crystals, melting at 85°, soluble in water, having a peculiar feebly aromatic odor and a mild taste. It is recommended in headaches, facial neuralgia, etc.—Berl. Klin. Wschr., 1903, No. 35.

Triquores is the generic name given to a new class of solutions (liquores), which require dilution with twice their volume of water (hence "Liquores-triplices"), and are protected by the coined name. The exploiters of these specialties have so far introduced the following "triquores": Ferri peptonati; ferri manganat. pepton.; ferri mangan. sacchar.; ferri comp.; ferri albuminati; ferri albuminati dulcis. One volume of these is mixed with 2 volumes of water, to which 10 per cent. of alcohol has previously been added, in order to produce the desired "liquor" suitable for prescriptions.—Pharm. Ztg., 48, No. 74 (Sept. 16, 1903), 756.

Turiolignin is the name given to an industrial by-product containing besides a body resembling *lignosulfite*, an abundance of resinous products derived from wood, which aromatize it and facilitate the inhalation of the sulphurous compounds upon which its remedial value is based. It is recommended for inhalations in all cases of diseases of the air passages, as an economical substitute for "*lignosulfite*."—*Pharm. Ztg.*, 48, No. 60 (July 29, 1903), 604.

Tussifugen is the trivial name for a cough remedy, otherwise called "*Syrupus Thymo-Tolietanus-Stephan*." It is said to consist of a specially-prepared extract of southern thyme, 15 per cent, and syrup of tolu, 85 per cent.—*Nat. Drugg.*, Febr., 1904, 42.

Tutulin is a nutrient preparation which is claimed to consist exclusively of pure plant albumins. It is supplied in form of a fine, nearly odorless, tasteless powder, which is to be added as a tonic to the other foods and beverages consumed by the patient.—*Pharm. Ztg.*, 49, No. 47 (June 11, 1904), 494.

Urocol, also called "*Urol-Colchicin Tablets*," is a specialty recommended particularly in acute gout. Each tablet contains 0.5 Gm. urol (= quinate of urea), 0.5 Gm. milk-sugar and 0.001 Gm. colchicine. Four or five of these tablets are said to give relief in most cases. *Pharm. Ztg.*, 48, No. 94 (Nov. 25, 1903), 953.

Urosanol is the name given to an injection, ready for use, containing 1-3 or 5 per cent. protargol gelatin, with instrument ready for use.—*Pharm. Ztg.*, 49, No. 18 (March 2, 1904), 191.

Valerydine is the name given to a compound of valerianic acid and phenacetin, which occurs in form of shining needle-shaped crystals, melting at 129°, soluble in alcohol, chloroform and acetone, less easily soluble in ether and almost insoluble in water. It combines the nerve-calming properties of valerian with the antipyretic and antineuralgic properties of phenacetin, and is recommended in all kinds of conditions connected with nervous irritation, in daily doses of 0.5 to 1.05 Gm.—*Bull. Pharm.*, July, 1903, 303.

Vanadin-Sanguinal is a specialty composed of vanadin pentoxide, 0.1 Gm.; hæmoglobin, 1.2 Gm.; natural blood salts, 5.5 Gm.; and peptonated muscular albumen, 5.3 Gm.; divided into 100 pills. Two or three of these pills to be taken thrice daily. Another specialty,

Vanadin Dusting Powder contains, in addition to vanadin pentoxide, zinc peroxide as active constituent, and is recommended as a disinfectant wound powder.—*Pharm. Ztg.*, 49, No. 27 (April 2, 1904), 283.

Vaporin is the name given by Dr. Stædeler to a remedy in whooping-cough, which he identifies as naphthen-eucalypto-camphora; and is said to be composed of: Naphthalin (purissim.), 180.0; camphor, 20.0; oil of eucalyptus glob., 3.0; oil of pinus picea, 3.0. It is used by placing about

a tablespoonful of this preparation into a glass of water and heating this until completely vaporized in the room occupied during that time by the patient.—P. Med. Ztg., 1903, No. 45.

Vigor-Nutrient ("Kraftnahrung") is the name given to a mixture of the active components of malt and egg-yolk, which, according to an analysis of Aufrecht, contains among other constituents: 40 per cent. of maltose; 35 per cent. of dextrin; 2.36 per cent. of mineral matter; 10 per cent. of albuminoids; and 5.8 per cent. of fat. It forms an agreeably tasting, stable powder, and is given in portions of a tablespoonful in water, soup, milk and other beverages or foods as a nutrient and invigorating remedy.—Pharm. Ztg., 48, No. 54 (July 8, 1903), 545.

Wheat-flour Extract is a nutrient product introduced by Dr. V. Klopfer, which is obtained according to Weissbein as follows: Wheaten flour is worked with water into a thick-fluid, salve-like mass, and this is subjected to centrifugation, whereby the starch grains accumulate on the sides, and the fluid portion, retaining the albumen and salts, on the inner side of the drum. This is then dried *in vacuo* and yields a product that is exceedingly rich in glutenous constituents—containing about 30 per cent. of albumen, 68 per cent. of carbohydrates, and 2 per cent. of nutrient salts. It is recommended for soups, conserves, and for the bread of diabetics.—Berl. Klin. Wschr., 1903, No. 53.

Wilburine is the name given to a Viennese specialty which is simply yellow American vaseline.—Pharm. Ztg., 49, No. 27 (April 2, 1904), 282.

Yanatas is the name of a remedy for seasickness, which is said to be essentially a one per cent. solution of chloral hydrate, to which a red color is imparted.—Centralbl. f. inn. Med., 1903, No. 9.

Zymin-Bougies are a specialty in form of bougies containing the active constituent of yeast ("zymin"), 40 p.; cane sugar, 40 p.; and inactive water-soluble constituents, 20 p., and are intended as an antigonorrhoeum for females.—Pharm. Ztg., 48, No. 85 (Oct. 24, 1903), 865.

MATERIA MEDICA.

A. VEGETABLE DRUGS.

GENERAL SUBJECTS.

Deterioration of Drugs—Causes and Prevention.—J. S. Hill communicates some short notes on the deterioration of drugs, and makes some suggestions for the prevention of those changes to which especially those drugs which are not frequently in use are subject. The chief agents that bring about these changes are the following:

1. Atmospheric conditions—variations of temperature, presence of much moisture and sunlight; these are active agents in bringing about such changes as oxidation. 2. Minute animal life—tiny beetles, mites and larvæ of various insects. 3. Fungal life—growth of moulds and other fungi producing fermentation and putrefaction.

Preventives in the case of the first class of changes, which may be due to evaporation, absorption of moisture or oxidation are the following:

1. Careful corking or stoppering of bottles to exclude air and prevent evaporation. 2. Storage in dry places not subject to extremes of temperature. 3. Sometimes protection from light by storing in amber-colored bottles.

The changes of the second class, which are confined to entire drugs, such as herbs and roots, are prevented by keeping the drug shelves clear and by frequent examination of the stock. Parcels found to be infected should be attended to promptly. Examine new stocks and see that entomological specimens are not given in with the drugs. Carefully-dried herbs, with care, will keep for a reasonable time.

The third class of changes, for which the microscopic fungi are responsible, are the cause of much of the damage done to drugs and galenicals. This is not remarkable when we consider that our atmosphere is always laden with a great variety of spores of the lowest type of plant life. Parcels of moist drugs (*e. g.*, badly dried herbs, and drugs stored in damp places) offer a good home to numerous moulds and similar fungi. These are the most troublesome to overcome, giving rise to fermentative action of every description—organized ferments being of three types, moulds, yeast plants and bacteria. The first two set up, as a rule, the alcoholic fermentation of sugary liquids, and the third produce the acetic, lactic, butyric and putrefactive fermentation. To prevent, as far as possible, the deterioration of drugs by fungal growth, great care must be exercised in storing such as are known to be subject to their unfavorable influence. Syrups and solutions may be preserved by pasteurization, which consists in heating in a water-bath up to 70° C. This will destroy mould and yeast germs, but the first time the cork of the bottle is removed the contents are sure to be infected. Careful sterilization of all jars and bottles intended to contain drugs and galenicals which have the reputation of becoming mouldy or fermenting is a good safeguard, as is the use of recently-boiled distilled water in making the stock solutions, and above all the judicious purchase of the stock in quantities that will insure the consumption before deterioration is likely to occur. It is well to remember that the stock-room requires as careful attention as does the front shop.—*Pharm Journ.*, May 14, 1904, 652.

Vegetable Drugs—Variations in Quality.—In an article on the standardization of vegetable drugs (in *Proceedings*, 1900, 565) Burt E. Nelson called attention to the variations in quality which had been observed in

certain alkaloidal drugs. That time has not tended to render the quality of such drugs more uniform, is shown by the following results obtained in more recent assays—the processes used being usually slight modifications of those described in “Lyons’ Assay of Drugs,” while the determinations were both gravimetric and volumetric and in each case in duplicate :

Opium (standard 13 to 15 per cent. of morphine). (1) 11.62, (2) 13.5, (3) 13.00, (4) 12.27.

Cinchona (standard 5 per cent. of total alkaloids). (1) 4.36, (2) 7.00, (3) 0.92, (4) 3.77, (5) 5.61, (6) 2.44, (7) 4.63.

Nux vomica (standard 1.50 per cent. of total alkaloids). (1) 2.00 (2) 3.33, (3) 1.22, (4) 1.65, (5) 1.60, (6) 2.44, (7) 1.82, (8) 2.11, (9) 1.98.

Hyoscyamus (standard 0.15 per cent. of total alkaloids). (1) 0.20, (2) 0.11, (3) 0.085, (4) 0.105, (5) 0.100, (6) 0.182, (7) 0.035, (8) 0.145, (9) 0.215, (10) 0.388, (11) 0.08, (12) 0.098, (13) 0.108, (14) 0.07.

Belladonna leaves (standard 0.35 per cent. of total alkaloids). (1) 0.24, (2) 0.38, (3) 0.255, (4) 0.388, (5) 0.285, (6) 0.150, (7) 0.365.

Stramonium leaves (standard 0.35 per cent. of total alkaloids). (1) 0.39, (2) 0.285, (3) 0.415.

Aconite (standard 0.50 per cent. of total alkaloids, physiological test 1-700, 5 Cc. 1 minute). (1) 0.55, (2) 1.10, (3) 0.45, (4) 0.62, (5) 0.71, (6) 0.15, (7) 0.85, (8) 0.67, (9) 1.33. Physiological test (6) 1-20, (9) 1-1100.

Coca (standard 0.50 per cent. of total alkaloids). (1) 0.61, (2) 0.11, (3) 0.35.

Colchicum seed (standard 0.50 per cent.). (1) 0.40, (2) 0.55, (3) 0.80, (4) 0.65, (5) 0.45, (6) 0.48, (7) 0.58.

Sanguinaria (standard 1.00 per cent.). (1) 0.97, (2) 1.17, (3) 1.68, (4) 0.95, (5) 0.85.

Hydrastis (standard 2 per cent. of hydrastine). (1) 1.67, (2) 1.45, (3) 1.05, (4) 1.26, (5) 1.85, (6) 2.05.

Ipecac (standard 1.75 per cent.). (1) 1.84, (2) 1.83, (3) 1.64, (4) 2.00, (5) 1.55, (6) 2.08.

Gelsemium (standard 0.35 per cent.) (1) 0.28, (2) 0.12, (3) 0.345, (4) 0.22.

Pilocarpus (standard 0.35 per cent.). (1) 0.30, (2) 0.39, (3) 0.22.

Phyostigma (standard 0.35 per cent. of eserine). (1) 0.232, (2) 0.18.

Ergot (standard 0.25 per cent. of Keller's cornutine). (1) 0.210, (2) 0.232, (3) 0.195, (4) 0.190, (5) 0.218.

Veratrum veride (standard 1.00 per cent.). (1) 0.86.

Columbo (standard 2 per cent.). (1) 2.35, (2) 1.26, (3) 1.87.

Stavesacre (standard 2 per cent.) (1) 1.68, (2) 2.15, (3) 1.89.

Digitalis (standard 0.25 per cent. of digitoxin). (1) 0.20, (2) 0.266, (3) 0.197, (4) 0.185.

Strophanthus (standard 0.75 per cent. of strophanthin). (1) 0.84, (2) 0.92, (3) 0.61.

Nearly all of these drugs were purchased from various jobbers and small importers, only a few lots of the hyoscyamus being purchased in 100-pound packages. All were received in the ground condition.—*Drugg. Circ.*, 47, No. 7 (July, 1903), 137.

Vegetable Powders—Diagnostic Characters.—In continuation of their previous series of papers on the diagnostic character of vegetable powders (see *Proceedings* 1901, 1902 and 1903) Prof. Henry C. Greenish and Eugene Collins have contributed the following, up to and including June 30, 1904, these papers, like the preceding ones, being illustrated with excellent cuts displaying the histological features that characterize the powder under consideration, and published in the "*Pharmaceutical Journal*" on the dates below mentioned :

Powdered Rhizomes and Roots—: Calumba root, gentian root, ginger rhizome, jalap root, liquorice root, marshmallow root (on February 27, 1904, 283–286).

Powdered Drugs—Analytical Scheme for their Microscopical Examination.—Burt E. Nelson continues the series of papers (begun in Merck's Report, July, 1900 [see *Proceedings*, 1901, 652], and continued since then in monthly installments with few intermissions), giving the details of an analytical scheme for the microscopical examination of powdered drugs. The installments which have appeared since the date of the last report (1903) cover the following drug powders: FLOWERS: *Anthemis*, *Matricaria*, *Calendula*, *Arnica*, *Santonica*, *Sambucus*, *Couso*, *Crocus*, *Humulus*, *Caryophyllus*. LEAVES: *Digitalis*, *Salvia*, *Belladonna*, *Tabacum*, *Senna*, *Pilocarpus*, *Uva Ursi*, *Chimaphila*, *Coca*, *Castanea*, *Eucalyptus*, *Rhus Toxicodendron*, *Hamamelis*, *Hyoscyamus*.—Merck's Rep., October (285–286) and November (317–318), 1903; January (6–7), February (37), March (68–69), and May (126–128), 1904.

Crude Drugs—Results of Examination of Different Kinds from Reputable Sources.—Howard Albert has examined samples of various drugs from reputable sources, with the object of seeing in what the crude drugs of the market are deficient in quality, and obtained the following results :

Scilla (squill).—Central portions, outer scales, membranous outer scales, siftings and dust, 12.898 per cent.

Menispermum.—Wrinkled drug, stems, drug with corky layer, dirt, 15.11 per cent.

Convallaria.—Leaves, small stones, bark from other plants, dirt, 5.68 per cent.

Veratrum Viride.—Lovage root, scaly portions from top of rhizome, pieces of string and small stones, dirt, 12.64 per cent.

Chimaphila.—Stems, oak leaves and chimaphila fruit, dirt, 20.88 per cent.

Senega.—Improperly dried roots, pieces of overground stems, dirt, 30.83 per cent.

Podophyllum.—Roots, old rhizome, dirt, small stones, moss, grass, 33.86 per cent.

Gentiana.—Sample was valueless on account of being improperly cured or dried, and had the appearance of being collected at the wrong season of the year.

Arnica Flores.—Contained a large percentage of the receptacle which should have been absent.

In an investigation along the same lines, Alva B. Currinder obtained results as follows :

Belladonna Root.—Leaves, small roots, stem remnants, and foreign matter, 24.4 per cent.

Aconitum.—One sample showed but 23.2 per cent. of tubers, conforming to the U. S. P. requirements or description. A second sample showed 83 per cent.—truly a wide variation.

Taraxacum contained 50.4 per cent. small roots, 38.3 per cent. medium roots, 7 per cent. very large old, more or less decayed roots, 4 per cent. dirt and foreign matter.

Sanguinaria not contaminated with foreign matter to any extent, but the broken rhizome showed considerable variation in color, which might also indicate variation in its medicinal activity—56.5 per cent. was red and 43.5 per cent. whitish.

Geranium contained 2 per cent. of dirt and podophyllum roots.

Cardamomum consisted of Mysore cardamom 36 per cent. and Malabar cardamom 62 per cent.

Caryophyllum contained 5.7 per cent. of stems and dirt.

The above results show to some extent the quality of some of the vegetable drugs on the market, and the importance of the knowledge of pharmacognosy on the part of the pharmacist, and the value of putting such knowledge into practice.—*Alumni Rep.*, Nov., 1903, 142.

Crude Drugs—Yield of Ash.—In their eleventh annual laboratory report Messrs. Southall Brothers & Barclay, limited, give the following table showing the percentage of ash yielded by drugs of good quality, and by

powders obtained from the grinding of drugs of the same character in the firm's own mills :

	Whole Drug.	Pow- der.		Whole Drug.	Pow- der.
Acaciæ gummi	2.74	2.99	Cascara sagrada.....	5.51	
	2.80	3.18		6.09	
	2.75		Cascarilla.....	8.27	
Aconiti radix (Anglic)	1.96		Cassiae pulpa.....	2.57	
(Exotic)	4.51	7.65	Catechu.....	3.38	5.34
Aloe Barbadosensis	1.73	1.51	Chirata.....	4.01	3.09
	1.17	2.58	Chrysarobinum.....	0.11	
Aloe socotrina.....	2.09	2.00	Cimicifugæ rhizoma.....	6.21	
	0.77		Cinchonæ rubræ cortex....	1.36	5.20
Aloe Uganda.....	0.59		Cinnamomi cortex.....	4.94	4.75
Ammoniacum.....	1.99			4.17	
Anethi fructus.....	7.73		Cocæ folia (Bolivian).....	4.02	
Anisi fructus.....	7.70	8.30	(Peruvian).....	8.09	
		10.78	Coccus.....	3.41	9.49
Anthemidis flores.....	5.72	6.28	Colchici cornus.....	1.85	2.51
	5.78		Colchici semina.....	4.02	5.25
	5.54		Colocyntidis pulpa.....	12.00	
	5.54			10.10	
Araroba.....	2.53			12.40	
Arnicae rhizoma.....	7.08			11.40	
Aurantii cortex.....	5.17			11.20	
	4.54			11.70	
	6.06			11.70	
Belladonnæ folia.....	12.82	10.85		11.20	
Belladonnæ radix.....	9.26	5.29	Conii folia.....	15.14	
Benzoinum.....	0.92		Conii fructus.....	5.53	
Balsamum tolutanum.....	0.40		Coriandri fructus.....	4.06	
	0.36			4.93	
	0.34		Cubebæ fructus.....	6.42	7.32
	0.39		Cuspariæ cortex.....	8.02	
Buchu folia.....	4.71	4.64	Cusso.....	9.40	
Calumbæ radix.....	4.72	6.97	Digitalis folia.....	11.21	9.39
Cambogia.....	0.38	1.81	Ergota.....	3.19	3.25
Cannabis indica.....	15.56	14.92		2.82	4.10
Cantharis.....	5.08	7.63		2.92	2.69
Capsici fructus.....	5.37	6.06		3.07	4.31
Cardamomi fructus.....	4.50			3.70	3.14
	5.12		Eucalypti gummi.....	0.47	
Cardamomi semina.....	7.53		Euonymi cortex.....	8.96	
	3.49		Filix mas.....	3.27	
	3.70		Foeniculi fructus.....	8.46	10.79
Carui fructus.....	6.20	6.74	Galbanum.....	4.45	
	5.76	6.20	Galla.....	1.76	1.75
	5.49		Gelsemii radix.....	1.57	
Caryophyllum.....	4.62	4.66		1.79	
	5.37		Gentianæ radix.....	2.43	4.53
	6.01			3.54	

CRUDE DRUGS.

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	Whole Drug.	Pow- der.		Whole Drug.	Pow- der.
Glycyrrhizæ radix.....	4.47 †	3.30	Myristica.....	1.91	2.46
	4.85			1.68	
Glycyrrhizæ radix.....	2.04		Myrrha	2.58	5.82
	3.66			6.69	10.72
Granata cortex	5.99		Nux vomica.....	1.13	2.45
Guaiaci lignum	1.05			3.77	7.18
Guaiaci resina.....	0.60	2.50	Opium	6.34	4.52
Hæmatoxyli lignum	1.58			3.61	
Hamamelidis cortex	3.42			2.77	
Hamamelidis folia.....	5.54		Papaveris capsulæ	11.28	
	4.32			8.63	
Hemidesmi radix	3.76		Pareiræ radix	2.49	
Hydrastis rhizoma	4.35		Physostigmatis semina. . .	3.11	
Hyoscyami folia (Exotic) ..	21.91		Pimenta	2.82	3.55
(Anglic)	14.02	12.43	Piper nigrum	3.26	6.32
Ipecacuanhæ radix	2.38	2.23	Podophylli rhizoma	3.16	
	2.12	2.65	Pruni Virginianæ cortex ..	2.96	
	2.45	2.03	Pterocarpi lignum.....	1.52	
	2.69	2.19	Pyrethri radix	3.89	
	2.38	3.38	Quassia lignum	2.51	
		2.72	Quillaia cortex.....	7.99	8.19
		2.59	Rhei radix.....	4.93	8.80
		3.29		7.27	10.01
		2.55			10.69
		2.88	Rhei radix (Anglic)	7.19	7.85
		2.49	Rosæ galicæ petala	1.84	
Jaborandi folia	4.54			3.11	
	4.63		Sambuci flores.....	10.02	
	4.16		Sarsæ radix.....	6.02	
	4.01		(Mexican)	10.46	
Jalapa	4.31	3.78	(Honduras)	5.75	
	3.33		(Lima)	5.12	
	3.46		Sassafras radix	0.77	
	3.61		Scammonia radix	9.12	
	3.62		Scammonium	3.42	
Jalapæ resina	0.22		Scilla	2.08	2.51
Kino	0.80		Scoparii cacumina	2.26	
Krameria radix	2.51	4.37	Senegæ radix	4.26	4.24
Laurocerasi folia†	6.21		Senna Alexandrina.....	7.88	8.61
Limonis cortex	3.66			8.55	
Lobelia	3.37	9.48		8.15	
	4.68		Senna Indica	8.35	9.45
	3.84			7.33	
Lupulin	13.42			8.67	
Lupulus	6.90			6.82	
	7.46			7.71	
Mezerei cortex	3.09		Serpentaria rhizoma	5.76	10.13
			Sinapis albæ semina.....	4.05	4.32
			Sinapis nigræ semina.....	13.26	4.32
			Staphisagria semina	13.26	11.69

† Not decorticated.

‡ Dried.

	Whole Drug.	Pow- der.		Whole Drug.	Pow- der.
Stramonii folia.....	20.18	22.02	Zingiber.....	2.43	3.78
	19.31			2.37	5.23
	13.97			2.57	6.27
Stramonii semina	2.44			2.50	4.03
Straphanthi semina	3.78		bleached.	4.89	5.91
Sumbul radix.....	6.09		bleached.	5.29	
Tamarindus.....	2.42		bleached.	4.11	
Taraxaci radix.....	3.20		bleached.	4.35	
Tragacantha	1.98	2.07		3.51	
	1.73	2.21		4.38	
	3.24			5.43	
Uva Ursi folia.....	2.45		bleached.	4.58	
Valerianæ rhizoma.....	11.61	17.44		4.13	
	11.02		bleached.	7.37	
Zingiber	4.11	3.02	bleached.	4.24	

—Pharm. Journ., October 31, 1903, 624.

Crude Drugs and their Powders—Yield of Ash.—The B. P. 1898, including ash-limits for a number of crude drugs, W. Chattaway and C. G. Moore consider it probable that in the next edition limits may be set for several others which have been frequently shown to contain very considerable amounts of mineral matter, either collected inadvertently or deliberately added. The authors, in view of this, have drawn up a tabular statement showing the results of various observers in a convenient form for consultation, this table embodying the figures given (1) in a paper by C. G. Moore and Martin Priest (in 1900), (2) in a paper suggesting standards of ash for drugs by J. C. Umney (in 1902), (3) in a laboratory report of John Barclay (for 1902), (4) and the figures obtained by the authors in the course of their more recent experiments. They furthermore call attention to the necessity of great caution in pronouncing judgment upon the quality of powdered drugs on account of a slight apparent excess of mineral matter, but believe that the figures given by them will indicate fairly what should be expected from samples of good quality. In grinding drugs it must be recollected that there will be a loss of moisture, and in some cases of volatile oil, which will cause the ash of the powder to be greater than that of the crude drug. In addition to this the process of sifting may cause accumulation of mineral matter in certain grades, and, again, the vibration of machinery may cause a settlement of mineral matter to the bottom of the package. Each drug is briefly considered by itself and in its reference to the figures in the table, which is here given—the figures indicating percentages:

Drug.	Moore and Priest.	J. C. Umney.	J. Barclay.	Chattaway and Moore.
Acacia gum.....	British Pharmacopœia limit, 4.0; all observers agree with this.			
Aconiti rad.....	4.7, 3.5, 3.8, 8.6, 5.0	6.0	2.0 to 4.5, P. *7.6	4.5 to 6.0
Aloes	2.6, 2.7, 1.6, 1.7, 4.1, 2.6	3.	1.7, 1.2, 2.1, 0.8, P. 2.6, 2.1, 1.5	1.0 to 4.0
Ammoniacum	2.3, 2.0, 1.6, 2.1, 5.6, 15.4, 2.3, 1.5	7.5	2.0	5.0
Anethi fruct.....	6.2, 7.5	8.0	7.7	6.0 to 7.0
Anisi fruct.....	4.9, 3.6, P. 11.4, 11.36	8.0	7.7, P. 8.3, 10.8	10.0
Anthemidis flor.....	4.3	6.0	5.7, 5.8, 8.5, 5.5, P. 6.3	6.0
Araroba	9.8, 5.3	7.5	2.5	7.5
Arnice rad.....	9.4, 8.9, 6.2, 33.7, 31.7, 15.5, 12.5, 12.1, 18.3	10.0	7.1	10.0
Asafoetida	figures vary from 2 to 60	20.0	.....	20.0
Aurantii cort. sicc.....	6.3, 6.5, 5.6, 6.2	7.0	5.2, 4.5, 6.1	7.0
Balsam, Peru.....	0.2	.....	.....	1.0
Balsam, Tolu.....	0.65	.....	0.4, 0.34, 0.4, 0.39	1.0
Belladon. rad	6.4, 8.1, 9.2, 7.2, 6.1, 7.3	7.0	9.3, P. 5.3	9.0
Benzoin	0.5, 0.8, 1.0, 0.9, 2.5 0.28, 0.82	2.0	0.9	2.0
Buchu fol.....	4.8, 4.4	5.0	4.7, 4.6	5.0
Calumbæ rad.....	5.1 5.7, 7.4, 7.8, P. 11.8, 10.3	6.0	4.7, P. 7.0	8.0
Cambogia	0.84, 0.75	3.0	0.4, P. 1.8	2.0
Cannabis Indica	13.8, 12.7	15.0	15.0, P. 14.9	15.0
Cantharides	7.4, 6.0, 10.0	7.0	5.1, P. 7.6	7.0
Capsici fruct.....	4.0 to 7.5	6.0	5.4, 6.1	.....
Cardamomi sem.....	4.5, 5.7, 3.7, 5.1, 5.1, 3.7, 3.3	6.0	7.5, 3.5, 3.7	6.0
Carui fruct.....	5.5, 7.5	8.0	6.2, 5.7, 5.5, P. 6.7, 6.2	8.0
Caryophyllum	5.4, 6.1, 5.2, 6.1, 6.0, 5.9, 5.2	6.0	4.6, 5.4, 6.0, P. 4.7	7.0
Cascara sagrada	4.6, 3.9, 7.0, 5.2	5.0	5.5, 6.1	7.0
Cascarilla cort.....	8.8, 7.5, P. 10.7	10.0	8.3	10.0
Catechu	3.6, 4.0, 4.4	5.0	3.4, P. 5.3	5.0
Chiretta	3.5, 3.0	6.0	4.0, P. 3.1	4.0 to 6.0
Cimicifugæ rhiz.....	7.1, 5.7, 7.0, 5.6	10.0	6.2	8.0
Cinchona	4.0, 13.0 (contained mineral matter)	4.0	1.4, P. 5.2	5.0
Cinnamon	4.1, 4.8, 5.9, 4.6, 5.5, P. 8.2	6.0	4.9, 4.2	6.0
Cocæ fol.....	6.3, 8.0, 7.2, 6.8	8.0	4.0, 8.1	8.0
Coccus cacti.....	8.2, 5.2, 7.8, 30.8, 31.7	8.0	3.4, P. 9.5	6.0
Colchici cormus.....	2.4, 2.2, 2.2	3.0	1.8, P. 2.5	3.0
Colchici sem.....	5.1, 2.6	5.0	4.0, 5.2	6.0

Drug.	Moore and Priest.	J. C. Umney.	J. Barclay.	Chattaway and Moore.
Colocynth. pulp.....	7.3, 7.2, 8.6, 10.1, 10.5, 9.2, 8.2, 12.1	10.0	12.0, 10.1, 11.4, 12.4, 11.2, 11.7, 11.7	9.0
Conii fol.....	.....	15.0	15.1	20.0
Conii fruct.....	.....	7.0	5.5	.....
Coriandri fruct.....	5.8	6.0	4.1, 4.9	6.0
Crocus.....	4.8, 4.7, 5.0, 4.9	7.0	.....	7.0
Cubebæ fruct.....	7.3, 5.3, pulv. 9.8	7.0	6.4, P. 7.3	8.0
Cuspariæ cort.....	6.7, 6.2	9.0	8.0	8.0
Cusso.....	4.7	7.0	9.4	.....
Digitalis fol.....	8.1, P. 10.6	10.0	11.2, P. 9.4	10.0
Elaterium.....	7.9	14.0	.....	.....
Ergot.....	3.5, 3.5, 3.7, 5.7, P. 5.7	6.0	3.2, 2.8, 2.9, 3.1, 3.7, P. 3.2, 4.1, 2.7, 4.3, 3.1	6.0
Eucalypti gum.....	0.62	0.5	0.2	1.0
Euonymi cort.....	9.6	20.0	8.9	10.0
Filix mas.....	4.9, 6.2	5.0	3.3	.....
Foeniculi fruct.....	12.1, 8.7, 9.1	10.0	8.5, P. 10.8	12.0
Galbanum.....	6.6, 7.2	8.0	4.4	8.0
Galla.....	2.3, 1.3	3.0	1.76, P. 1.75	5.0
Gelsemii rad.....	2.1, 2.3, 2.1	3.0	1.6, 1.8	3.0
Gentianæ rad.....	3.3, 4.0, 2.9, P. 2.2	5.0	2.4, 3.5, P. 4.5,	5.0
Glycyrrhiæ rad.....	3.6, P. 3.3	4.0	4.8, P. 3.3, 2.8, 3.7	5.0
Granati cort.....	13.1, 15.5	15.0	.....	16.0
Guaiaci lig.....	1.3	3.0	1.1	2.0
Guaiaci res.....	1.4, 1.3, 3.7, 5.6	3.0	0.6	2.0
Hæmatoxyli lignum.....	2.1, 1.8, 2.7	2.0	.....	2.5
Hamamelidis fol.....	8.5, 5.1, 4.6	8.0	5.5, 4.3	8.0
Hamamelidis cort.....	4.7, 5.1, 5.0	5.0	3.4	6.0
Hemidesmi rad.....	4.4	4.0	3.7	5.0
Hydrastis rhiz.....	12.0, 8.5, 4.7	10.0	4.3	.....
Hyoscyami fol.....	11.8, 8.6	12.0	21.9 Exot., 14.0 Ang., 12.4 P. Ang.	.....
Ipecacuanhæ rad.....	3.2, 2.1, 2.9, 2.5, 3.1	5.0	2.0 to 3.4	5.0
Jaborandi fol.....	6.0, 8.1, P. 11.7	7.0	4.5, 4.6, 4.2, 4.0	8.0
Kino.....	1.4	2.0	0.8	2.0
Krameriæ rad.....	1.6	2.0	2.5, P. 4.4	2.0
Limonis cort.....	4.9, 5.3	5.0	3.7	5.0
Linum.....	3.6, 3.3, 3.6	5.0	.....	5.0
Lobelia.....	9.0	12.0	3.4, 4.7, 3.8, P. 9.5	10.0
Lupulinum.....	15.6	14.0	13.4	.....
Lupulus.....	10.8	7.0	6.9, 7.5	10.0
Mezerei cort.....	3.1, 3.0	4.0	3.1	4.0
Moschus.....	5.2	8.0	.....	8.0
Myristica.....	2.4, 2.1	4.0	1.9, 1.7, P. 2.5,	5.0
Myrrha.....	3.8, 3.6, 9.9, 4.2, 17.0, 3.2, 9.8, 9.8, 3.8	6.0	2.6, 2.6, 6.7, P. 9.8, 10.7	6.0
Nux vomica.....	2.0, 1.3, 1.1	2.0	1.1, 2.4	2.0
Papaveris capsule.....	9.1	10.0	11.3, 8.6	12.0
Pareiræ rad.....	3.4, 3.6, 3.5	4.0	2.5	5.0

Drug.	Moore and Priest.	J. C. Umney.	J. Barclay.	Chattaway and Moore.
<i>Physostigmatis sem.</i>	3.9	4.0	3.1	4.0
<i>Pimento</i>	4.2	5.0	2.8, 3.5	5.0
<i>Piper album</i>	1.0 to 3.0	.....	.....	3.0
<i>Piper nigrum</i>	4.0 to 7.0	7.0	3.3, P. 6.3	4.0 to 7.0
<i>Podophylli rhiz.</i>	2.9	5.0	3.2	5.0
<i>Pruni Virg. cort.</i>	5.1, 4.2, 4.0, 4.6	6.0	2.9	6.0
<i>Pterocarpī lig.</i>	1.7	1.0	1.2	2.0
<i>Pyrethri rad.</i>	6.0, 5.3, 4.9, P. 18.5, 17.5	5.0	3.9	6.0
<i>Quassia lig.</i>	3.4, 3.7	4.0	2.5	4.0
<i>Quillaia cort.</i>	14.6, 14.1	12.0	8.0, 8.2	.....
<i>Rhei rad.</i>	12.2, 11.0, P. 7.4	12.0	4.9, 7.3, P. 8.8, 10.7	30.0
<i>Rhœades petala</i>	18.0, 20.0	16.0	.....	20.0
<i>Rosæ Gallic. petala</i>	2.8	4.0	1.8, 3.1	4.0
<i>Sassafras rad.</i>	6.5	8.0	6.0, 10.5, 5.7, 5.1	.....
<i>Sassafras rad.</i>	0.64	2.0	0.8	2.0
<i>Scammonia rad.</i>	11.1, 10.9	12.0	9.1	12.0
<i>Scammonium</i>	7.9, 4.9, 6.1	.....	3.4	6.0
<i>Scilla</i>	3.8, 2.8, 2.9, 3.4, 2.5, P. 2.5	4.0	2.1, P. 2.5	4.0
<i>Scoparii cacumina</i>	3.5	4.0	2.3	4.0
<i>Senegæ rad.</i>	4.0, 3.1, 4.6, P. 24.0	5.0	4.2, 4.4	5.0
<i>Sennæ fol.</i>	5.6, 8.6, 9.1, 10.9, 10.4, 8.9, 7.2	14.0	7.9, 8.4, 8.5, 7.3, 8.1, 8.6, P. 9.4	14.0
<i>Serpentaria rad.</i>	8.9, 30.7, 10.1, 13.4, 6.0, 7.1, P. 18.0, 18.4	10.0	5.7, 10.1	9.0
<i>Sinapis</i>	4.0 to 6.0	5.0	4.0, 4.3, 4.3	4.0 to 6.0
<i>Staphisagria sem.</i>	26.0, 14.0	15.0	13.3, 11.7	15.0
<i>Stramonii fol.</i>	18.1, P. 20.1	15.0	20.2, 19.3, 13.9, 22.0	20.0
<i>Stramonii sem.</i>	3.0	3.0	2.4	3.0
<i>Strophanthi sem.</i>	3.8, 3.4, 3.4, 4.0	5.0	3.8	5.0
<i>Sumbul rad.</i>	5.7	6.0	6.1	7.0
<i>Taraxaci rad.</i> .....	.....	7.0	3.2	7.0
<i>Tragacanth</i>	2.9, 4.9	4.0	3.2, 2.0, 1.7, P. 2.1, 2.2	5.0
<i>Uvæ ursi fol.</i>	3.7	4.0	2.4	4.0
<i>Valeriana rhiz.</i>	8.0, 8.6, 13.7, 15.1, 19.5, P. 20.9	10.0	11.6, 10.0, 17.4	9.0
<i>Zingiber</i>	3.0 to 5.0	5.0	2.4 to 6	3.0 to 6.0

In the above table the letter "P" indicates the powdered drug. The brief preliminary notes above alluded to cannot find place here and must be consulted in the original reprint from the "Analyst" (July, 1903), in Pharm. Journ., Sept. 26 and Nov. 28, 1903, 455 and 807.

Referring to the preceding, every comprehensive paper of Messrs. Chattaway and Moore, in which it is shown that workers are agreed as to the average ash of the drugs met with in pharmacy with but few exceptions, John C. Umney remarks that, although the records of different ex-

perimenters differ a little according as the results are stated as averages, or as maxima or minima which the ash percentage should not pass, he thinks it may be accepted that the ash of fair qualities of the drugs, with certain exceptions below mentioned, is constant within the narrow limits which are set out in the tables of the results of the work of Barclay, of himself, and of Chattaway and Moore, in the above-mentioned paper. In the case of the exceptions referred to, the acceptable percentages of ash appear to be still in doubt, and the object of the present paper is to make a few observations on the discrepancies which occur in the records of various workers and possibly the reasons for their existence in the following drugs, the authors' conclusions only being given here :

Cimicifuga Rhizome.—After consideration of the whole of the circumstances, the suggestion of an average, or even maximum, ash of not more than 8 per cent. made by Chattaway and Moore should be accepted as not unreasonable.

Colocynth.—In the author's experience the ash may vary from 7.2 up to 13.5 per cent. in samples of Turkish colocynth, but no great importance should be attached to the ash-assay for freedom from seeds in the powder, it being preferable to place reliance on the microscopical characters and freedom from oil.

Conium Leaves.—Not more than 16 per cent. is suggested as a maximum of ash in this drug.

Cubebs.—The author would maintain as a maximum of ash for cubebs not more than 7 per cent., this maximum allowing for the use of a fair average sample of cubebs as met with in commerce.

Elaterium.—It might be politic to reduce the ash maximum from 14 to 10 per cent. or slightly lower.

Jaborandi Leaves.—A maximum of 7 per cent. of ash might be maintained.

Lobelia.—There is no objection to the statement of a high ash maximum (say 12), though as an average probably 9 to 10 per cent. would be approximately correct.

Rhubarb.—The enormous variation in the ash of rhubarb is a matter to which attention has been repeatedly called during the last thirty years. During the past ten years the average ash has varied from 7.5 to 15 per cent. But it is not a matter of importance to fix an ash standard for this drug ; reliance should be placed on more definite chemical characters for valuation purposes.

Stramonium Leaves.—The range of ash observed by the author is from 13.6 to 20.3 per cent. The raising of the ash maximum from 15 to 20 per cent., as suggested by Chattaway and Moore, would therefore appear necessary, unless it be shown that high ash-content is accompanied by a deficiency in alkaloid.—Pharm. Jour., Dec. 12, 1903, 879-880.

Vegetable Drugs Used as Soap-Substitutes—List of Plants Yielding Them.—L. Rosenthaler has prepared and reports a long list of plants, belonging to thirty-five natural orders, which have been used as soap-substitutes or may be used as such on account of the abundance of saponin found in them.—Apoth. Ztg., 18, No. 98 (Dec. 9, 1903), 868–869.

Spices from the French Colonies—Analyses.—Balland has examined a number of spices grown in the French colonies with the results shown in the following :

Nutmegs gave the following figures :

	Nutmeg.	Testa.	Mace.	Nutmeg.	Testa.
Water	11.00	11.00	20.00	17.00	10.00
Nitrogenous matter ...	5.10	2.76	7.37	7.15	2.02
Fat (and essential oil).	23.85	1.30	36.10	27.55	0.90
Cellulose	10.10	26.60	5.10	6.25	55.35
Ash	2.70	1.00	2.20	2.50	1.20
Extractives (?).....	47.25	55.34	29.23	39.55	30.53

The chief figures of interest in regard to

Peppers are the ash limits. Cayenne pepper (from *Capsicum annuum* and *C. frutescens*) gave ashes containing traces of manganese of from 3.80 to 9.80 per cent. Black peppers gave 3.70 to 4.92 per cent., whilst white peppers gave 1.30 to 2.0 per cent.

Vanilla gave the following figures in three samples :

	Grand Comore.	Réunion.	Tabiti.
Water	19.80	20.70	13.70
Nitrogenous matter ...	5.94	5.74	4.96
Fatty matter	10.80	14.70	11.30
Sugar	14.20	17.80	18.50
Extractive	30.41	17.66	38.64
Cellulose	16.00	20.20	8.20
Ash.....	2.85	3.20	4.70

—Chem. & Drugg., Nov. 21, 1903, 865 ; from Rép. de Pharm., 1903, 294.

Silajit—An Ancient Eastern Medicine.—David Hooper has recently investigated an ancient Eastern medicine called “Silajit,” which appears to occur in several different forms, designated as white, brown and black, and differing also in origin. The *brown “silajit”* appears to be more or less pure native aluminium sulphate ; the *black silajit* is a dark substance, probably of vegetable origin, although it contains a large quantity of mineral matter. The chief ingredients of the ash are calcium, magnesium, potassium, and sodium, combined as carbonates. The bulk of the organic material consists of an acid which is related to humic acid. The third variety, *white silajit*, was found by the author to be of animal origin, being, indeed, crude urea or inspissated urine in the solid state. The therapeutic uses of silajit are most varied, it having been quite recently

recommended as a digestive and laxative, suitable for dyspepsia, diabetes, diseases of the liver and spleen, to regulate the action of the heart, and as a good respiratory stimulant and expectorant. As Hooper remarks with truth, before European physicians can prescribe white, black or brown silajit for any disorder, it will be necessary to ascertain the nature of the chief active ingredients, and to procure a regular supply of a uniformly-prepared medicine.—Pharm. Journ., Nov. 28, 1903, 777; from Journ. Asiatic Soc., Bengal, 72, 2, No. 3.

Ipu Akka.—A Borneo Arrow Poison.—Wefers-Bettink has made a chemical examination of an arrow poison, employed by the Dajaks of Borneo for war purposes, as well as the chase, known by the name of "ipu akka." He finds the poisonous constituents to be antiarin, upain, strychnin; non-poisonous constituents, an albuminoid substance, a resinous body containing cinnamic acid ester, and several other bodies not subjected to nearer examination. It is evident from these results that the poison is not identical with the arrow poison, "ipu akka," recently examined by Boorsmans (1902). and that various arrow-poisons are designated in Borneo by the same or similar name.—Pharm. Ztg., 48, No. 72 (Aug. 5, 1903), 626; from Pharm. Weekbl., 1903, 395.

BACILLARIÆ.

Oxidizing Bacterium.—Occurrence in Wine Vinegar.—While examining a wine vinegar, R. Zazerac obtained cultures which, after a short time, reduced the cuprò-potassic reagent, and contained a microbe very different in form and in the appearance of its cultures from the *Mycoderma aceti*, and the bacterium of sorbose. When carefully isolated on glycerinated gelose (2 per cent.), it constantly gave, with glycerin broth, homogeneous cultures, possessing this reducing power at ordinary temperatures, and the author has proved that it is capable of rapidly oxidizing glycerin, transforming it into dioxycetone. This microbe is fairly large, and is easily stained with the basic aniline colors. It will not grow in meat broth, nor on potatoes, but grows well on glycerin gelose.—Chem. News, June 10, 1904, 287; from Bull. Soc. Chim. (3), xxix., No. 16.

Tubercle Bacillus.—Improved Method of Staining in Sputum.—Peltriset claims that the following method of counter-staining enables the presence of tubercle bacilli to be determined more easily and certainly than the methods generally in use. A portion of the sputum is spread out on a cover-glass and stained with Ziehl's carbol-fuchsin. Fuchsin, 1; phenol, 5; alcohol (90 per cent.), 10; distilled water, 100; being heated to 60–70° C. for one minute, then washed free from excess of stain, drained and plunged for a minute in the following counter-stain: Solution of methylene blue, 10 per cent., 1; pure acetone. 9; solution of caustic soda, 1: 10,000, 10. The preparation is then washed, dried and mounted. This method shows the tubercle bacilli stained red, other organisms and the

nuclei of cells blue, against an almost colorless background. Another method, which is longer, but possibly even more certain, consists in plunging preparations, after staining as above in carbol-fuchsine, in a solution of: Alcoholic solution of methylene blue, 10 per cent., 10; solution of caustic soda, 1:10,000, 30; the cover is kept in this stain until the red of the fuchsine appears entirely replaced by the blue dye, which will require ten to twenty minutes. It is then washed, drained, dried and mounted.—Pharm. Journ., April 16, 1904, 517; from *Annales de Chim. Analyt.*, 3, 427.

Tubercle Bacilli—Demonstration in Urine.—Dr. E. Thevithick finds that the presence of tubercle bacilli in urine may be easily demonstrated by the following method: The lower stratum of the urine which has been allowed to stand in a conical glass is pipetted off and centrifugated. After decanting the supernatant clear liquid, the minute deposit at the bottom of the centrifugating glass is washed with distilled water by shaking it up, and again centrifugating, the process being repeated once more. From the deposit thus obtained films are prepared and stained in the usual manner. This process of washing and centrifugating is stated to render the detection of the bacilli easier in urine than it is in sputum.—Pharm. Journ., Febr. 13, 1904, 148; from *Brit. Med. Journ.*, 1, 1904, 13.

FUNGI.

Fungi—Effect of Radium Rays on the Development of the Lower Forms.—J. Dauphin finds that exposure to radium rays arrests the growth of the mycelium of *Mortierella* and prevents the germination of its spores, while the growth is exposed to its influence, but that the action is purely that of a paralyzant. Cysts are produced in the interior of the filaments, which are evidently formed as defensive organs against the action of the rays. Spores and mycelia exposed to radium emanations are not killed, their animation is merely suspended. When removed from the influence of the rays, they commence to grow afresh.—Pharm. Journ., April 2, 1904, 466; from *Compt. rend.*, 138, 154.

Yeast.—Detection when used as an adulterant of *Meat extract*, which see under "Pharmacy."

FILICIS.

Aspidium Athamanticum—A Valuable Taenifuge.—Anton Altan calls attention to the taenifuge value of the rhizome of a Roumanian species of *Aspidium*, *A. athamanticum*, the so-called "panna-rhizome," and gives a comprehensive morphological and anatomical description of the drug, accompanied by cuts showing the characteristic elements. The proximate examination of panna-rhizome gave the following result: Fixed oil, 3.365; resin, 8.505; tannin, 2.750; coloring matters, 2.123; albuminoids, 1.123; starch, 9.956; cork, wood, cellulose, 64.056; inorganic constituents, 8.122.

Given to adults in doses of 12 Gm., divided in three equal doses given 5 minutes apart after fasting, and followed 15 minutes later by 50 Gm. of castor oil, the drug has proven uniformly efficient.—Pharm. Ztg., 49, No. 6 (Jan. 20, 1904), 59; from Jour. de Pharm. Chim., November, 1903, No. 11.

Aspidium Spinulosum.—*Composition of the Fixed Oil of Rhizome*.—The rhizome of *aspidium spinulosum* being frequently found as an admixture in considerable quantities of the official rhizomes of *Aspidium filix-mas*, F. Farup has undertaken an investigation of the fixed oil contained in the ethereal extract of *A. spinulosum*, such having heretofore not been recorded in the literature. The results of this investigation prove this oil to consist preponderatingly of olein. Besides this it contained linoleic acid, amounting to about 4 per cent. of the liquid acid, some solid fatty acids, which have not been subjected to nearer examination, probably also isolinolenic acid. The most characteristic constituent, however, is *phytosterin*, a body which has not been found by Katz in the official extract of male fern (from *Aspidium filix-mas*). This facilitates the diagnostic differentiation of the two species of *Aspidium*.—Arch. d. Pharm., 242, No. 1 (Jan. 31, 1904), 17-24.

GRAMINÆ.

Barley.—*Conditions Necessary to Germination*.—A. Nilson's experiments show that enzymes are not indispensable to the germination of barley, and are not the primary cause of the growth. In his opinion, the agent which starts the series of chemical changes constituting germination is a lactic acid producing bacterium, which is always present in the barley grain under normal conditions. For the experiments which have led the author to that conclusion, the original paper must be referred to.—Journ. Amer. Chem. Soc., 26 (1904), 269.

Lolium Temulentum.—*Relation of a Parasitic Fungus of the Seed to Its Toxicity*.—The poisonous properties of the seed of the darnel, *Lolium temulentum*, has long been known, and the poison has been extracted by ether. According to a writer in "Gardner's Chronicle" (33, 306) recent investigations tend to show that there is a relation between the poisonous properties of the seed and a fungus, the hyphæ of which are found in the remains of the nucellus, between the exterior wall of the aleurone layer and the hyaline layer of the grain. In the seeds of two other species of *Lolium* this fungus has been detected, and both of these seeds are poisonous.—Pharm. Journ., Aug. 22, 1903, 297.

COMMELINÆ.

Tradescantia Erecta, Jacq.—*A New Hæmostatic*.—Simonis calls attention to the value of *Tradescantia erecta*, Jacq., a plant indigenous to Mexico and South America, as a hæmostatic. It may be used both inter-

nally and externally, either in the form of the fresh herb reduced to pulp or in the form of a 20 per cent. decoction of the dry drug, and is particularly recommended on account of its innocuous character and the simple manner of its use.—Pharm. Ztg., 49, No. 27 (April 2, 1904), 282.

ASPARAGINEÆ.

Jamaica Sarsaparilla.—*Botanical Source*.—In a highly interesting paper on "Jamaica Sarsaparilla from Honduras," Dr. H. H. Rusby brings abundant evidence that the so-called Jamaica sarsaparilla, which in reality is imported from Costa Rica, and formerly from New Granada, is not derived from *Smilax officinalis*, Kunth, as stated by Flückiger and Hanbury, but in all probability from

Smilax ornata, Hooker (?), and that much of the Jamaica sarsaparilla is in reality collected in Honduras, whence Mr. Percy Wilson, a representative of the N. Y. Botanical Garden, has sent authentic specimens of the plant, including root, fruit, leaf and stem, for identification. These several parts are described and shown in illustration. The sarsaparilla grown in Jamaica is undoubtedly derived from a different plant, while the drug known commercially and officially as Honduras sarsaparilla, is also derived from a plant different from *Smilax ornata*. Unfortunately, Mr. Wilson was unable to penetrate into the interior whence the commercial Honduras sarsaparilla is derived, and where, he was informed, sarsaparilla was collected from a different plant.—Drugg. Circ., 47, No. 11 (November, 1903), 224-226.

LILIACEÆ.

Aloes.—*Comparative Value and Method of Valuation*.—By the method below described, Prof. A. Tschirch has determined the value of different kinds of aloes on the basis of the chloroform residue obtained under the conditions of the test. Cape aloes gave 86.8 and 81.2 per cent. of chloroform residue, Uganda aloes 81.2 per cent., fresh Barbados aloes 72.4 per cent., old Barbados aloes 62.8 per cent., Curaçao aloes 66.6 per cent., and Socotrine aloes 36.6 per cent. These results indicate that the selection of Cape aloes as the official drug in the German Pharmacopœia is justified, since it contains less inert resin than the other kinds. It is suggested that in those pharmacopœias in which Cape aloes are official, it should be required to give not less than 80 per cent. of chloroform-soluble matter. The test is carried out as follows: 5 Gm. of the sample is macerated in a 50-Cc. flask with 5 Cc. of methyl alcohol for 12 hours; it is then warmed to 50-60° C., and treated with 30 Cc. of chloroform. After thorough agitation it is set aside, and the yellow chloroform solution separated from the insoluble resinoid matter by filtration into a tared Erlenmeyer flask. The solvent is then distilled off, and the recovered chloroform again used to extract the resin; this is repeated four times in all. Finally, the chloroform is distilled off, and the residue dried to con-

stant weight and weighed. This residue should be yellow in color, and give distinct crystals of aloin when recrystallized from methyl alcohol.—Pharm. Post, 27 (1904), 265.

Colchicum—Toxic Effect.—L. G. Davies records a case of supposed poisoning by colchicum. The patient, an elderly man, had taken two Blair's Gout Pills on an empty stomach, and in an hour and a-half developed symptoms of acute colchicum poisoning. Recovery followed the use of sedatives and carminatives, but not before muscular twitching and choleraic symptoms had appeared.—Pharm. Journ., Jan. 16, 1904, 52; from B. M. J., 2237, 1272.

Colchicum—Percentage of Alkaloid and Estimation in the Seeds and Corms.—G. Bredemann observes that the quantitative determination of the alkaloid in colchicum corms and seeds presents particular difficulties which are not experienced in the assay of other alkaloidal drugs because of characters which distinguish colchicine from all other alkaloids, in consequence of which a number of methods have been proposed, which the author has subjected to a critical and experimental review. He finds that, irrespective of the method of assay, alcohol of 60° to be the most suitable menstruum for the extraction of either corm or seed, and that alcohol of 90°, usually recommended, has no advantage; also that the extraction of the seed is more complete if they are employed in form of powder than if the whole seed is employed, statements to the contrary notwithstanding. Furthermore, that percolation, notwithstanding that it requires more time, is preferable to extraction in the Soxhlet apparatus, mainly, however, because of the inexpensiveness of the percolators and convenience in pharmaceutical laboratories. Of the different processes of assay he prefers that of Katz, which, under certain modifications, is carried out as follows: The coarsely-powdered seeds or corms are exhausted by percolation with 60° alcohol so as to produce 10 per cent. tinctures. Of these, 50 Gm. are concentrated to 20 Gm. by evaporation, 0.5 Gm. of paraffin and 20 Gm. of water added, and the heat continued until the alcohol is completely removed, and a residue of 10 to 15 Gm. results. After cooling, the liquid portion is filtered, the residual paraffin cake, consisting of paraffin and fixed oil derived from the drug, is melted and washed with a mixture of 10 Gm. of water and 1 Gm. acetic acid followed by water, the liquids so obtained, after cooling, being filtered through the same filter and added to the filtrate previously obtained. The united filtrates are now transferred to a separator, chloride of sodium is added so as to produce a saturated solution and leave a trace undissolved, and the mixture is then shaken out with 20 Cc. of chloroform, followed by portions of 10 Cc. until a few drops of the aqueous fluid produces no longer a turbidity when allowed to flow along the walls of a test-tube into $\frac{1}{2}$ solution of potassium iodide. The chloroform solutions of the alkaloid, having been filtered in the order obtained through the same small filter, are evaporated to dryness, the residue

is dissolved in a little water to decompose the compound of colchicine and chloroform which has been formed, the solution filtered, if necessary, and the water evaporated, the residue being finally dried over sulphuric acid to constant weight. The author examined 7 samples of seed and 5 samples of corms by this method, the lowest yield of colchicine from seed being 0.3986, the highest 1.02 per cent., while the corms yielded from 0.1780 to 0.6048 per cent. Fresh corms, collected by the author and containing 69.1 per cent. of moisture, yielded 0.1945 per cent., and fresh, unripe seeds, collected in May and containing 85.77 per cent. of moisture, yielded 0.03 per cent. of colchicine. Experiments to determine the practicability of the volumetric methods of estimation that have been proposed have not given results from which definite conclusions could be reached.—Apoth. Ztg., 18, Nos. 93, 94 and 95 (Nov. 21, 25 and 28, 1903), 817, 828 and 840.

IRIDÆÆ.

Russian Wild Saffrons—Comparative Value.—Professor Wladimir Tichomirow has made an interesting comparative examination of the varieties of saffron produced in the Trans-Caucasus and in Southern Russia (Crimea) which he finds are derived principally from several wild varieties of *Crocus* indigenous to the regions in which they occur and are to some extent probably also cultivated. These varieties are

Crocus sativus var. β -*Pallassii* Maw (*C. Pallassii*, Marshall-Bieberstein) and

Crocus speciosus—Marshall-Bieberstein, the botanical characters of which are described by the author together with the histological features of the saffron obtained from them, these being shown in several tables accompanying the author's paper. The chemical investigation of these two kinds of Russian saffron show that both of them must be regarded as valuable commercial products, the saffron from *C. Pallassii*, Marsh.-Biebr. deserving the predicate "superior," while that from *C. speciosus*, Marsh.-Biebr., must be designated as "good." The first named is in no way inferior in tinctorial power, aroma, etc., to the best grades of official saffron, whilst the second, though not quite so aromatic, possesses tinctorial qualities very little inferior to official saffron of good quality.—Arch d. Pharm., 241, No. 9 (Dec. 15, 1903), 656-668.

AMMOMEÆ.

Cardamoms—Method of Curing in India.—J. W. Mollison describes the method of washing and curing cardamoms employed in the Bombay Presidency, India. The washing and manipulation is performed by women, and water from special wells which is supposed to be particularly suited to the purpose, is employed. The cardamoms are first washed in earthenware vessels containing a mixture of the well water and pounded

soap-nut and a species of acacia, in the proportion of two pounds of the former to a quarter pound of the latter. About ten pounds of cardamoms are treated at one time. Two women stir them vigorously in the mixture for about one minute and then allow them to rest about an equal length of time, and again stir for another minute. A thick lather results. This completes the first washing, after which the cardamoms are baled out by hand into a basket where they are allowed to drain for a few seconds, and then subjected to a second washing similar to the first except that the mixture contains less of the soap-nut preparation and the addition of a quantity of soap solution. They are then thrown upon a mat and sprinkled with water from the special well at intervals of a half hour, until the next morning, when they are spread upon the roof of a house and allowed to dry for four or five hours. After nipping off the short stalk, an operation performed with a large pair of shears by women who are often very expert, the cardamoms are sorted, only the most plump fruits being prepared for the foreign market. Besides bleaching by this process, cardamoms are also subjected to starching in India. The starched product has a whiter appearance than the bleached cardamoms. The starch is prepared by pounding together rice, wheat, country soap and buttermilk. The paste is diluted with water and sprinkled over the cardamoms as they are rubbed by hand.—Pharm. Era., Febr. 11, 1904, 137; from "Brit. and Col. Druggist."

Turmeric—Detection in Powdered Rhubarb.—Griggi recommends the following test for detecting turmeric in powdered rhubarb: 1 Gm. of the powder is intimately mixed in a mortar with 0.1 Gm. of finely powdered boric acid. The mixture is placed in a porcelain capsule and moistened with 9.6 Cc. of dilute sulphuric acid. The capsule is then cautiously heated over a Bunsen burner, the pulp-like mass being kept constantly stirred. Pure rhubarb will show no change but a slight darkening of color, but if turmeric be present it gradually assumes a fine dark reddish-purple color, due to the formation of the so-called rosocyanin of Schlumberger. If the mixture be moistened with dilute ammonia before it cools, the rosocyanin will assume a transient blue color. Pure rhubarb merely shows its own characteristic deepening of color.—Pharm. Journ., Feb. 13, 1904, 184; from Boll. Chim. Farm.

Turmeric—Diphenylamine not a Reagent.—J. E. Saul has examined into the nature of the diphenylamine test for turmeric proposed by Albert E. Bell for the detection of this coloring matter in complex powder (see Proceedings, 1903, 730). This reagent consists of 1 Gm. of diphenylamine, 20 Cc. of 90 per cent. alcohol and 25 Cc. of pure sulphuric acid, and is stated to develop a fine purple coloration when a powder containing turmeric is treated with it. On submitting the test to a practical trial it was found that a brilliant crimson-violet color was produced. A mixture of alcohol and sulphuric acid was then prepared in the above proportion,

but without the addition of the diphenylamine, and cooled. This reagent on trial with turmeric produced a color indistinguishable from that developed by the solution containing diphenylamine. The reaction is therefore not due in any degree to the diphenylamine, but is the result of the action of the strong sulphuric acid on the turmeric in the presence of alcohol. The color is destroyed on dilution with water or alcohol.—Pharm. Journ., Jan. 9, 1904, 29.

ORCHIDEÆ.

Vanilla.—*Source, Cultivation, Varieties, etc.*—J. H. Dow contributed an interesting paper on vanilla at the meeting of the Vermont Pharmaceutical Association in 1903, which gives information concerning the source, cultivation, varieties and relative value of vanilla beans, and the character by which the commercial sorts may be distinguished from one another. The paper cannot be advantageously condensed and must therefore be consulted in the original or in full reprint.—Proceedings Vt. Pharm. Assoc., 1903, 49-59.

Vanilla.—*Cultivation in the Comoro Islands.*—The Barbados "Agricultural News" states that the most profitable crop in the Comoro Islands (French) is vanilla. The first plantations date back ten years, having been started at Anjouan in 1893. At present there are more than 70,000 vines in cultivation, which yield about 40,000 kilos. (about 90,000 lbs.) of vanilla annually. In Comoro vanilla can be cultivated up to a height of over 2,500 feet above sea-level. It is usually trained on "pignon d'Inde," which is forced to branch by cutting the ends when the plants are about six months old. The vanilla is planted at the foot-supports; the slips are from 20 to 40 inches long, and three or four nodes and internodes are buried in the soil. The plants yield fruit in the third year. The pollination is carried out by women and children, and the flowers which are not fertilized are removed.—Chem. & Drugg., Jan. 30, 1904, 188.

Vanilla.—*Presence of Heliotropin in a Genuine Variety.*—The occurrence of heliotropin (piperonal) along with vanillin in the fruits of *vanilla pompona*—the so-called vanillons, pompons, or La Guayra vanilla of commerce—has been noted before. Fr. Göller now calls attention to the occurrence of a variety of vanilla from Tahiti, which, evidently a fruit derived from the true vanilla plant, *vanilla planifolia*, also contains heliotropin and is, therefore, like the vanillons, useful only for perfumery, and unsuited for preparing culinary extracts. This vanilla is not distinguishable from the true vanilla except by its odor, which is pronouncedly that of heliotropin.—Pharm. Centralh., 45, No. 11 (March 17, 1904), 192.

SANTALACEÆ.

Santalum Album.—*Inquiry into the Cause of the "Spike" Disease.*—Frederick S. Mason, who last year called attention to the threatened ex-

tion of *santalum album* in Southern India (see Proceedings, 1903, 730) writes that the Mysore Government is now taking the matter up very seriously. A commission of experts has been over the ground, and hope to be able to issue a report which will have some practical bearing on the cure of the "spike" disease. The plant is threatened with extermination in a comparatively short time, unless some means can be found to prevent the disease spreading by means of the subterranean suckers, with which the sandal preys on adjacent trees.—Pharm. Journ., March 12, 1904, 366.

Sandal-Wood Trees—Mode of Growth.—The recently observed disease of the sandal-wood trees has induced Sir D. Brandis to investigate the growth of the plants. It appears from his observations that the young plants produce ordinary rootlets and fibrils and root-hairs, but when the roots reach the roots of other plants and form small swellings or haustoria at the points of contact, the root-hairs disappear and the fibrils become few. The sandal thus becomes parasitic on a number of trees, and although it is difficult always to trace the roots upon which it is parasitic, actual evidence has been obtained in the case of *Albizzia odoratissima*, *Strobilanthes cuspidatus*, *Limonia acidissima*, and *Webera asiatica*. The trees with which the sandal tree is most frequently associated are: *Litsæa tomentosa*, *Terminalia ovalifolia* and *T. paniculata*, *Anogeissus latifolia*, *Zizyphus ænophia*, *Scutia indica*, *Acacia cæsia*, *A. pennata*, *Pongamia glabra*, *Memecylon edule*, *Olea dioica*, *Flacourtia sepiaria*, *Atalantia monophylla*, *Murraya exotica*, *Bambusa arundinacea*, *Dendrocalamus strictus*, *Toddalia aculeata*, *Mallotus philippinensis*, *Inga dulcis*, *Morinda citrifolia*, *Feronia elephantum*, *Alanigum lamarckii*, *Cocos nucifera*, *Mangifera indica*, *Psidium guava*, and *Moringa pterygosperma*.—Pharm. Journ., Feb. 27, 1904, 247; from Rev. des Cult. Colon., 14, 47, 48.

PROTEACEÆ.

Orites Excelsa—Presence of Aluminum Succinate.—In a communication to the Royal Society of New South Wales, H. G. Smith records the occurrence of large quantities of aluminum in one of the "silky oaks," *Orites excelsa*, N. O. Proteaceæ, which is plentiful in New South Wales and Queensland. A section of the tree, three feet in diameter, was found to contain a large deposit of basic aluminum succinate, $\text{Al}_2(\text{C}_4\text{H}_4\text{O}_6)_3 \cdot \text{Al}_2\text{O}_3$. The ash of the wood furthest removed from the deposit contained 79.61 per cent. of alumina, a larger amount than has been previously recorded in any of the Cryptogams, in which alone aluminum has been supposed to occur. This specimen was exceptionally rich in the aluminum salt, but the amount of alumina in the ash of three other specimens was found to range from 36 to 43 per cent. A large proportion of the alumina was present as potassium aluminate, and as no potassium carbonate was found, it is probable that the potassium aluminate exists, as such, in the tree. In

the ash of one specimen from Mullimbimby, cobalt and 3 per cent. of manganese were found, so that probably cobaltiferous manganese occurs in the district. Free normal butyric acid was found to accompany the deposit of aluminum succinate; from this the succinic acid is probably formed by oxidation, and then combines with the alumina to form the basic succinate. The ash of *Grevillea robusta*, *G. hilliana*, and *G. striata*, was found not to contain alumina. The previously recorded occurrence of alumina in the ash of these trees is probably due to the wood examined, erroneously attributed to them, being derived from *Orites excelsa*.—Chem. News, Sept. 11, 1903, 135.

LAURINEÆ.

Beilschmiedea Bark—*Examination of a Supposed Sample*.—Elsie S. Hooper reports on the examination of a bark, sent to Mr. E. M. Holmes from India by the late Dr. Dymock with the statement that it was the bark of *Beilschmiedea fagifolia*, var. *Dalzielii*, and that it was said by the native doctors to be a tonic febrifuge, antispasmodic, and expectorant in asthmatic cough. The bark occurs in simple quilled pieces, about 8 in. long and $\frac{3}{8}$ in. thick. It is light-brown in color externally, and shows numerous transverse lenticels, from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. long. Internally it is lighter in color and quite smooth. The fracture is short, and the cut surface, examined with a lens, shows wavy medullary rays, extending about half way across the surface. The powder of the bark is strongly sternutatory, and when mixed with water produces much frothing. From the careful microscopical examination, which is given in detail accompanied by illustrations exhibiting the principal histological features, as well as from a partial chemical examination, the author concludes that the bark is not derived from a species of *Beilschmiedea* or from a tree belonging to the natural order *Lauraceæ*. Commenting on this paper at an evening meeting of the Pharmaceutical Society, Mr. Holmes stated that he had compared this bark with the Kew specimen of *Pittosporum floribundum* under a lens, and the two specimens appeared to be almost identical. *P. undulatum*, an Australian species, was very similar, but *P. floribundum* was the chief or only variety collected in India.—Pharm. Journ., Mar. 12, 1904, 361 and 365.

Camphor—*Formation*.—H. Shirasama gives the following interesting account of the formation of camphor in the leaves and stem of the tree. The oil-cells appear very early under the growing point. The cells contain in the young organs an ethereal oil formed in a mass called by Tschirch the resigenous layer. The resigenous layer and the oil are thicker in plants grown in tropical climates than in that of Southern Europe. Old leaves contain a larger proportion of oil than those of more recent growth. The change into camphor does not take place until some time after the oil is formed. In old wood the oil is less yellow than in

young wood, and crystals are also more abundant. The parenchyma contains more colorless oil and crystals than other tissues, and oil cells are not found in the woody parts, fibrovascular bundles and epidermis; they are more abundant in the secondary than in the primary bark, and are most plentiful in wood parenchyma.—Pharm. Era, Feb. 11, 1904, 137; from "Bull. Col. Agric., Tokio."

Cinnamomum Pedatinervium.—*Yield and Characters of the Volatile Oil of the Bark*.—By distilling the bark of *Cinnamomum pedatinervium*, a tree indigenous to Fiji, with steam, E. Goulding obtained nearly one per cent. of volatile oil, which, when first distilled, is nearly colorless, but gradually becomes yellowish-brown. It has a sweet aromatic odor, a pungent, spicy taste; its sp. gr. is 0.964 at 15°; optical rotation $[\alpha]_D -4.96^\circ$, and it is composed: (1) of a terpene, $C_{10}H_{16}$, having the sp. gr. 0.8659 at 15°, the optical rotation $[\alpha]_D -17.72^\circ$, and yields an uncrystallizable dibromide, $C_{10}H_{16}Br_2$; (2) linalool; (3) safrol; (4) eugenol and (5) probably eugenol methyl ether. The quantitative composition of the oil is approximately as follows: Terpene, 15.2 per cent.; alcohols, 30 per cent.; esters, 1.5 per cent.; safrol, 40.50 per cent.; eugenol, 1 per cent. and eugenol methyl ether (?), 3 per cent.—Pharm. Journ., Nov. 28, 1903, 778; from Proc. Chem. Soc., 19, 201.

MYRISTICÆÆ.

Ochoco Nuts.—*A New Oil Seed from West Africa*.—E. M. Holmes calls attention to the ochoco nuts which, according to Dr. Voigt, are now exported from West Africa. These fruits have been described under the name of

Ochocoa gabonensis Pierre, and by Warburg as *Scyphocephalum ochocoa*.—They are about 1 to $1\frac{1}{2}$ inches in width and $\frac{1}{2}$ to $\frac{5}{8}$ inch in thickness, with a hard, thin, brittle shell. They have a circular basal scar, and internally resemble an areca nut, but are of softer substance, and are more nearly allied to the nutmeg. Ochoco nuts are stated to yield 61 per cent. of a fat, melting at 70° C. J. Möeller having identified an ochoco seed as derived from a species of *Dryobalanops*, it would appear that the name is given to the produce of several distinct trees, the ochoco fruits of the Gaboon being derived from *Ochocoa gabonensis*, Pierre.—Pharm. Journ., Nov. 14, 1903, 713.

POLYGONÆÆ.

Rhubarb.—*Method and Determination of Active Constituents in Different Samples*.—Prof. Tschirch recommends the following method, proposed by Cristofolletti for the determination of the "oxymethyl-anthraquinone" in rhubarb: 0.5 Gm. of the finely powdered drug is heated with 50 Cc. of a 5 per cent. solution of sulphuric acid for fifteen minutes, and on cooling is transferred to a separator with 50 Cc. of ether. After well shaking the

ether is separated and the liquid exhausted with more ether until the separated ether shows no color on the addition of a little potash solution. Four or five shakings with fresh ether are usually necessary. Another heating of the extracted solution is necessary, and a further extraction with ether. The whole of the ethereal liquids are mixed and extracted with potash solution, and made up to a known bulk. The color is then compared with a standard solution of emodin in alkali. Following this method, the percentages of this active substance in a number of different varieties of rhubarb were determined by the author, with results as follows :

Rhubarb—Shensi	3.3	Rheum anglicum.....	2.5
“ “	2.8	“ “	1.8
“ Shanghai.....	3.3	“ officinalis	2.0
“ “	3.3	“ gallicum	2.8
Rheum palmatum.....	2.8	“ collinianum.....	1.8
Rhubarb—Canton	2.4	“ austriacum.	1.6
“ “	2.5	“ “	1.6
“ “	2.8	“ raponticum.....	1.2

—Chem. and Drugg., June 25, 1904, 1001 ; from Pharm. Post, 1904, 249.

GLOBULARIÆ.

Globularia Alypum, L.—*Constituents of the Leaves*.—Dr. Rudolph Tie-mann has subjected the leaves of *Globularia alypum*, L., which are used in the south of Europe as a purgative and emetic, to comprehensive chemical examination. From the ethereal extract he isolated an acid, *globularic acid*, and a non-glucosidal bitter principle, *picroglobularin*; from the alcoholic extract a glucosidal coloring matter, *globulariacitrin*. The bitter principle,

Picroglobularin, is a yellowish-white powder, has no distinct melting-point, and no chemical reaction that might serve for its identification. Its chief characteristic is its intensely bitter taste. The coloring matter,

Globulariacitrin, is a distinctly crystalline body, resembling in its character the flavon glucosides, quercitrin, queræcitrin, etc. It has the composition conforming to $C_{27}H_{15}O_{16}$, and is split by hydrolysis into globularia-quercetin, glucose and rhamnose.—Arch. d. Pharm., 241, No. 4 (July 11, 1903), 289–306.

SCROPHULARINÆ.

Digitalis—*Method of Collection, Preservation and Dispensing*.—Calling attention to the necessity and value of the standardization of digitalis and its preparations on the basis of their physiological effects upon frogs, and that such preparations are now supplied by a responsible German firm, Dr. A. Wolff describes as essentials that the digitalis leaves be collected on days that are free from rain and then rapidly dried in a vacuum within a few hours after collection. This will prevent the fermentive changes to

which the digitalis glucosides are subject when, as is the practice, the leaves are exposed for days in the ordinary methods of drying. But even this is not sufficient, for experiments recorded by Prof. R. Kobert, with digitalis leaves which had been standardized in the pharmaco-dynamic way and found in every way satisfactory, showed in the following year a depreciation of fully 50 per cent. in their physiological action, notwithstanding that in their external appearance they exhibited no change whatever. It is, therefore, further suggested that the leaves, collected and dried as above recommended, be pulverized and *preserved in the compressed state*, carefully excluded from air—exposure to air being the chief factor in inciting the action of the digitalis ferment on the glucosides. Moreover, it is suggested that the form of compression should be that of tablets, each tablet containing, or, if mixed with milk-sugar, representing, a dose of the drug. These tablets are securely and conveniently enclosed in glass tubes. Larger tablets containing 1 Gm. of the drug may also be supplied for the convenient preparation of infusions.—Pharm. Centralh., 44, No. 36 (Sept. 3, 1903), 585-587.

Digitalis Leaves—Preservation in Form of Powder.—Calling attention to the undoubted deterioration of digitalis leaves under the influence of water content, Caesar & Loretz point out the necessity of eliminating the water to a maximum of 1, or at most, $1\frac{1}{2}$ per cent. This cannot well be reached, however, with the entire leaves, but is readily accomplished if the leaves are reduced to a coarse powder, a form which is, moreover, the best to employ for the preparation of infusions of digitalis. Repeated experiments have, in fact, demonstrated that if the infusion is prepared from digitalis leaves simply cut, the digitoxin reaction is not nearly so strong as when the infusion has been prepared from the identical drug in form of powder. The powder, perfectly dried, should, of course, be preserved in air-tight containers.—Pharm. Ztg., 48, No. 74 (Sept. 16, 1903), 754.

Digitalis—Physiological Standardization.—Since the discovery of digitoxin, which is regarded as the active constituent of digitalis leaves, numerous endeavors have been made to standardize digitalis preparations on the basis of their digitoxin content. H. F. Moschkowsch, referring to this, remarks that more recently experiments have been directed to the determination of the digitoxin by physiological methods, which in nearly all cases depended upon the susceptibility of the heart of the frog to the action of this constituent of digitalis and the belief that by this means a direct quantitative estimation of digitoxin in different preparations could be effected. The author gives an account of the experiments undertaken with the object of ascertaining the availability of such a method, depending upon the greater or less rapidity in which the systolis of the heart of frogs is affected by digitoxin and preparations prepared by himself, using for this purpose frogs procured at different seasons, in different locations, and of both sexes. For the details of these experiments, the original

paper must be consulted. It may suffice here to say that, basing his conclusions on the result of his experiments, the author is of the opinion that standardization of digitalis preparations by the physiological method indicated is not by itself sufficient. Nevertheless, the method is not without value, but, as suggested by Ziegenbein (see Proceedings, 1903, 740), Fraenkel, and more recently Focke, is defective. His experiments point out that the individuality of the animal plays an important part in such examination; it, therefore, seems necessary in the first place to unite upon the sex, the species, the source (habitat), the season and the weight of the animals that are to be used for the experiment if reliable data for comparison are the desideratum.—Arch. d. Pharm., 241, No. 5 (July 31, 1903), 358–371.

Digitalis—Value and Method of Physiological Standardization.—Dr. C. Focke maintains that so long as chemistry fails to develop a reliable method of standardizing digitalis, reliance must be placed on some method of physiological standardization. He communicates the nature of his experiments made for the purpose of determining a suitable physiological method depending upon the action of digitalis preparations upon the heart-action of frogs. He finds that while such standardization is not reliable if it is undertaken with winter and spring frogs, uniformly reliable results are obtainable with frogs from the end of June to the end of September if the experiments are carried out under the same conditions. The sex of the frog is of no influence on the experiment at this period, nor does the source appear to be of consequence. The opinion of the physiological activity of the sample should be based on the time required for the suspension of the heart's action, selected from intervals of 7 to 20 minutes; but there is urgent necessity for experimenters to agree on a uniform standard. The digitalis leaves should be standardized only in the form of fine powder, and the drug should be preserved in that condition in perfectly dry air-tight glass containers. He attributes Moschkowitsch's unsatisfactory results to the use of preparations made with 70 per cent. alcohol, which, while containing all the digitoxin, were partially devoid of certain water-soluble substances which are necessary to its full effectiveness—such variations being responsible for the irregular action observed.—Arch. d. Pharm., 241, No. 9 (Dec. 15, 1903), 669–689.

Digitalis Grandiflora—Pharmacological Value.—According to recent experiments made by Boudgest, *Digitalis grandiflora*, a yellow-flowered species of digitalis which is found abundantly in Switzerland, possesses activity as a cardiac remedy, quite as pronounced and fully equal to that produced by *Digitalis purpurea*. This has been demonstrated by previous investigation, and there seems, therefore, no longer any ground for the rejection of the leaves of *D. grandiflora* as a medicinal agent.—Pharm. Ztg., 48, No. 92 (Nov. 28, 1903), 934; from Nouv. Reméd., 1903, No. 21.

SOLANACEÆ.

Belladonna Leaves—Adulteration with Phytolacca Leaves.—A sample of Bosnian belladonna leaves has been examined in the University of Buda Pest and found to contain 50 per cent. of the leaves, twigs and flowers of *Phytolacca violacea*. The leaves somewhat resemble those of belladonna, but their upper surface is devoid of hairs and brighter than that of belladonna leaves.—Pharm. Post., 1903, 377.

Hyoscyamus Muticus—Chemical Examination and Possible Therapeutic Advantages.—It having heretofore been shown that *Hyoscyamus muticus*, grown in India, as well as the Egyptian plant, contained a high percentage of alkaloid, consisting of practically pure hyoscyamine (see Proceedings 1899, 525), it occurred to F. Ransom and H. J. Henderson that a drug with powerful mydriatic properties, due exclusively to hyoscyamine, might present certain therapeutic advantages for galenical preparations over the official henbane, and they accordingly made some further examinations from a pharmaceutical standpoint with material supplied by Mr. Ernest A. Floyer, of the Egyptian Institute, the results of which they now communicate. Three varieties of the drug were examined: (1) the light-brown stalk, from which most of the leaf had been removed—this being the kind usually found in the London market; (2) a compressed brick consisting mostly of leaf with small proportions of leaf stalk and seed-capsules; (3) the unripe seed-capsules containing some seed—the last two kinds being readily procurable if in demand. The percentage of moisture in these varieties was determined by drying the drug in a current of warm air at 70°–80° C., and the percentage of alkaloid by practically the same method as that employed by Dunstan & Short, the result being as follows:

	Moisture.	Alkaloid in Dried Drug.
1. Stalk, etc.....	10 p. c.	0.498 p. c.
2. Leaf, etc.	18 p. c.	0.900 p. c.
3. Seed-capsule	10 p. c.	0.585 p. c.

A tincture having been prepared from the drug by percolation with 45 p. c. alcohol and standardized to contain 0.01 per cent. of alkaloid, this being about the strength which might be expected of the official (B. P.) tincture, prepared with best English henbane, specimens were supplied to various hospitals and medical men, and although as yet no definite reports have been received, sufficient information has been received from one experimenter to justify the belief that the tincture is a reliable preparation of considerable therapeutic value. The authors append to their paper some interesting remarks regarding the growth of the plant in Egypt, by Mr. Floyer, from which it appears that *Hyoscyamus muticus* grows wild all over Egypt, where it is known by the name of "Sakran" "the drunken," but always sporadic. In the rich soil of the Valley of the Nile the plant

luxuriates, a shrub weighing when fresh as much as sixty pounds, has large, succulent leaves, but does not give a very large amount of seeds, while in light, sandy soil the plant has less leaf but more flowers, and in coarse sand a very largely-developed root, the leaves becoming less and less and the seed-vessels more and more numerous, so that a single plant may sometimes ripen 5,000 seed-pods, each pod containing possibly as many as 100 seed grains.—Trans. Brit. Pharm. Conf., 1903, 560–563.

Tobacco—Products of Combustion when Smoked as Cigarettes.—An examination of numerous samples of Russian tobacco by J. J. Pontag shows a variation in nicotine content of from 0.44 to 3.99 per cent., the average being 2 per cent. When smoked in form of cigarettes, about one half of the nicotine finds its way into the cigarette-smoke, so that even moderate cigarette-smoking must be injurious. Thus, in smoking twenty cigarettes, the smoker draws into his mouth 0.09 Gm. of nicotine, 0.011 Gm. of pyridine bases, 0.032 Gm. of ammonia, 0.006 Gm. of hydrocyanic acid, and 360 Gm. of carbonic oxide.—Ztschr. f. Unters. d. Nahrungs. u. Genussm., 6 (1903), 673.

Tobacco—Removal of Poisonous Products of Combustion.—H. Thoms has for some time been engaged experimentally in devising a simple and efficient method of depriving tobacco smoke of its poisonous components, these consisting essentially of nicotine and the pyridine bases resulting from its splitting up. His experiments show that the smoke may be deprived to a large extent of these poisonous constituents by causing it to traverse a porous medium, such as cotton-wool, for instance, saturated with ferric chloride. This has the effect of absorbing not only the bases named, but also the ammonia, bisulphide of carbon, and hydrocyanic acid. If, for instance, a cigar is inserted into a tube containing a quantity of cotton saturated with 50 per cent. of ferric chloride, the smoke is deprived completely of the pungency which it manifested when drawn from the cigar without the intervention of the ferric chloride cotton. Direct experiments have shown that about 77 per cent. of the nicotine and pyridine bases, originally present in the tobacco smoke, are thus removed, together with 86 per cent. of the combined ammonia and about 14 per cent. of the free ammonia, while only about 50 per cent. of the hydrocyanic acid was retained. Besides these, the disagreeably odorous pyrogenous oil and the bisulphide of carbon were completely removed from the smoke. The complete removal, however, of these deleterious and unpleasant components of tobacco smoke is not possible, nor is it desirable, for such would deprive the smoker of all pleasure derived from smoking.—Apoth. Ztg., 19, No. 2 (Jan. 6, 1904), 13; from Chem. Ztg., 1904, No. 1, 1.

OLEACEÆ.

Olive Oil—Its Composition and Chemistry.—F. J. Smith gives a description of the method of extracting olive oil, its composition, adulterations

and general tests, such as specific gravity, solidifying point, the elaidin test, iodine absorption test, as well as the special tests for detecting the presence of lard oil, rape oil, cotton-seed oil, poppy-seed oil, peanut oil, and undue proportion of free acid. This interesting paper may be consulted in *Amer. Drugg.*, 44, No. 8 (April 25, 1904), 231-233.

Italian Olive Oil—Necessary Conditions to Secure a Pure Product.—A. Augusto, who introduces himself as an Italian who has had chances to plant and cultivate olive trees, who has picked olives, manufactured oil, and uses largely of it, says there are only three tests that he can reliably apply to the assay of olive oil, namely, looking at it, smelling it and tasting it. He knows that fine olive oil must be of a pure, clear, light-amber color, without any trace of green; odorless, except that little pleasant smell proper of olive oil; and of a fresh, fragrant, soothing taste. This degree of purity is, in his opinion, obtainable only in one way, and that the oldest, slowest and most expensive, which thus has uncontested preference to the new, quick and economical methods. This old method consists in picking the olives before they are too ripe, grinding and pressing them, separating the oil from the muddy water and depositing it in proper vessels until, with the coming of the warm season, it becomes clear. Then, after being decanted two or three times at intervals of a few weeks, it is ready to go into commerce. That this method is an expensive one becomes apparent when it is considered that the olives, being not ripe, adhere firmly to the plant and must be picked by hand; that they must be ground and pressed the next day, and that three men and one horse are required to work out 20 or 25 bushels of olives in one day, producing 12 gallons of oil. Moreover, fresh olives do not give as much oil as those which have been kept for a few weeks, while, in addition, the expense account is increased because almost a year is required before the oil has reached the grade of maturity and purity demanded for a first-quality article. Nevertheless, any one who can afford to make oil in such manner, and wait indefinitely for selling it, will surely have his price, because *olive oil, when properly made, does not deteriorate by age, but improves*, while oils made by modern methods become rancid and putrid when summer heat comes.

Concerning the olive oil supplied to the American markets, the author observes that the American estimation of pure olive oil is so persistently connected with the name of Lucca, in Italy, that nothing will pass muster that does not bear the magic word "Lucca" on the can or label. In truth, Lucca can hardly supply herself with her own oil, and it can readily be conjectured what may be supplied under this name. To provide the American market with olive oil, there is only left one way, to pass under the guns of the New York importers and the Leghorn exporters. Both those *inter-commercial elements* do their best to enlarge their profit; hence the olive oil supplied may be simply manufactured in New York, or when imported directly from Italy, it may be oil of the lowest degree

to meet the great American cry, "cheap, cheap."—*Amer. Journ. Pharm.*, 76, No. 5 (May, 1904), 219-221.

Olive Oil—Ingenious Methods of Adulteration.—Tambon, discussing the methods of adulterating olive oil, points out that the present-day adulterations do not consist in the addition of a single cheaper oil, but of ingeniously prepared mixtures of different oils in such proportions to each other that on analysis it becomes difficult or impossible to distinguish the adulterated from the genuine oil by the chemical and physical constants accepted for the latter. The chief adulterants are benne, peanut and cotton-seed oil. Of these, benne is easily recognized; for peanut oil there is as yet no reliable color reaction, and while Beechi's reaction may, under certain conditions, answer well for the detection of cotton-seed oil, this, under others, has also proven unreliable.—*Pharm. Ztg.*, 49, No. 10 (Febr. 3, 1904), 104.

LABIATÆ.

Peppermint—Influence of Surroundings on the Components of Plants.—Hébert, in conjunction with Truffant, and again with Charabot, has studied the external circumstances on the composition of plants, the researches made with the former concerning the mineral matter of the plants, the latter concerning its organic composition. Peppermint is one of the plants studied, and, after giving a long series of analyses, the authors come to the conclusion that the addition of manures to a soil does not influence the quality of the mineral matter contained in a given plant, but only the quantity. The amount of mineral matter is increased, but if the manure be a suitable one, the relative proportions of the various salts in the ash are not altered. If, however, one salt predominates in the manure, this is absorbed to a greater extent, the relative proportions of the others remaining unaltered. A similar conclusion is come to in regard to the organic composition of the plant, the only difference being due to the natural accumulation of nitrogenous reserve materials. Here, again, it is claimed that the manure will affect the quantity, but not to any extent the quality, of the organic matter of the plant-substance.—*Chem. & Drugg.*, April 9, 1904, 578; from *Bull. Soc. Chim.*, 29-30, 1235.

Ocimum Viride—Reported Antagonism to Mosquitoes.—Some time ago Captain Larymore, writing from northern Nigeria, announced the discovery that the basil-plant, *Ocimum viride*, possessed the power of driving away mosquitoes. By placing three or four of the plants round his bed he was able to sleep unmolested, without a mosquito-net. Dr. W. T. Trout, of Freetown, Sierra Leone, has since then investigated the matter in the light of science, and finds that as a specific against mosquitoes the bark falls woefully behind the hopes held out. Growing plants have little or no effect, nor have the fresh leaves prejudicial effect on mosquitoes when placed in close contact with them.—*Chem. & Drugg.*, Aug. 8, 1903, 274.

CONVOLVULACEÆ.

Jalap—Percentage of Resin.—Numerous analyses of jalap root made by G. Weigel convince him that the average percentage of resin in this drug is higher than is usually stated. Out of fifty-five lots of root twenty-eight showed from 12 to 18 per cent., the remainder mostly about 8 to 10 per cent., although the quantity fell as low as 4.6 per cent. The largest roots contain most resin, and these are bought up by the makers of jalapin. Scammony root he finds to contain from 5.5 to 13 per cent. of resin, the average being about 10 per cent., a figure that agrees fairly well with that published by Barclay (8.6 per cent.). Orizaba jalap contains more than scammony root, viz., on the average of 17 or 18 per cent.; the resin is identical with the resin of scammony root.—Pharm. Centralh., 44, No. 46 (Nov. 12, 1903), 789-795.

Mexican Scammony Root—Botanical Source and Characters.—A specimen of root imported under the name of Mexican scammony root has been identified by E. M. Holmes as being undoubtedly the root of

Ipomoea Orizabensis, and is described as follows: The appearance is quite characteristic and quite different from that of scammony root. It occurs mostly in transverse slices, showing concentric rings, from which coarse fibres protrude on both of the transverse surfaces. The sections are mostly those of the larger portion of the root, and vary from 2 to 3 in. or more in diameter, but are only about $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in thickness. The smaller roots are about 1 in. or so in diameter, but are frequently 3 or 4 in. long; a few pieces are obliquely cut. The concentric arrangement of the vascular bundles at once distinguishes it from the root of *Convolvulus scammonia*, in which they are scattered and somewhat rounded, forming islands, as it were, in the softer tissue. It appears that during 1903 there was an importation of over 3,000 bags, which sold readily to the German makers of scammony resin. Analyses made showed from 6.4 to 22.2 per cent. of resin, but most of it yielded about 17 per cent. While chemically there appears to be no difference between scammony resin and the resin of *Ipomoea orizabensis*, it remains to be ascertained if they are identical in their physiological action. At the request of Dr. Holmes, Mr. Harold Dean has determined the amount of resin in the above-mentioned specimen and, in a separate paper, gives the method employed and the results, as follows: The drug was powdered, exhausted by percolation with alcohol (90 per cent.), the greater part of the alcohol distilled off, and the resulting strong tincture poured into three times its volume of water. The resin separated as a mass of honey-like consistence. It was well-washed with boiling water until the washings were free from sugar and from color, and then dried on a water-bath until the weight was constant. The yield of resin amounted to 18.5 Gm. from 100 Gm. of the powdered drug; this is the highest percentage yet recorded from this

source. The dried resin was pale brown, and almost entirely insoluble in ether, the insoluble portion from 18.5 Gm. weighing less than 0.25 Gm. It had the general characters of scammony resin. The powdered drug, dried at 100° C., yielded 9.89 per cent. of ash.—Pharm. Journ., March 5, 1904, 226 and 327.

Scammony—Quick Method for the Determination of Resin.—E. Dowzard recommends the following simple and expeditious method for the determination of resin in scammony: Weigh 2 Gm. of the finely powdered sample and transfer to a 50-Cc. conical flask; to this add 20 Cc. of ether (accurately measured). The flask is then closed with a sound, tightly-fitting cork; shake gently until complete disintegration takes place. The flask should be given a rotatory movement to prevent the solution from touching the cork. After standing for fifteen minutes, with occasional shaking, the ethereal solution is passed through a dry filter-paper. Evaporate 10 Cc. of the filtrate to dryness in a weighed beaker; dry at 100° C. and weigh. Then, making allowance for the increased volume due to the resin held in solution, which the author estimates at about 0.075 Cc. for 0.1 Gm. of the resin, the percentage is calculated as follows supposing the yield to be 0.724 Gm. from the 10 Cc. of filtrate:

$$7.24 \times 0.075 = 0.543 \times 2 = 1.036. \text{ This calculation shows that the 20 Cc. of ether has increased in volume to a little over 21.086 Cc.; then, } \\ 21.086 \times 0.724 = 15.266 \times 50 = 76.33, \text{ the percentage of resin contained}$$

in the sample.—Pharm. Journ., April 2, 1904, 469.

APOCYNACEÆ.

Asclepias Curassavica, L.—Reputed Remedial Value.—Dr. Dathan St. Cyr, of Hayti, has presented a specimen of *Asclepias curassavica, L.*, to the museum of the Pharmaceutical Society of Great Britain, and states that he has obtained such remarkable results from its use in the treatment of phthisis that he has been induced recently to visit Paris with the view of having the properties of the plant investigated. E. M. Holmes adds that the plant is met with in England as an ornamental green-house plant, and that in the West Indies it is known as “bastard ipecacuanha,” and sometimes exported to England under the name of ipecacuanha.—Pharm. Journ., Nov., 1903, 714.

Apocynum Cannabinum—Cardiac and Diuretic Value.—J. Pawinski confirms the value of *Apocynum cannabinum* as a remedy in heart affections and as a diuretic. He has found that in doses of 10 to 15 minims the fluid extract is a valuable substitute for digitalis, from which it differs in acting more promptly, but the effects are not so lasting. It is an extremely potent diuretic, and very prompt in action. In moderate doses it does not give rise to digestive disturbance, but in large quantities may occasion pain, vomiting and sometimes diarrhoea. Its administration

should therefore be commenced with small doses, gradually increased. It shows no indication of a cumulative action.—Pharm. Journ., May 21, 1904, 789; from Nouv. Remèdes, 20, 121.

Strophanthus Gratus (Wall. et Hook.) Franch.—*Chemical and Pharmacological Distinction of the Seeds*.—Dr. Ernst Gilg gives a botanical and pharmacognostic description of the seeds of *Strophanthus gratus* (Wall. et Hook.), Franch., a high-winding liane, distributed sparingly, usually in single examples, in the primeval forests of the west African coast, from Sierra Leone in the north to the mouth of the Congo in the south. In its chemical constituents, the seeds of this species of strophanthus are characterized by the presence of a crystalline strophanthin, while the seeds of nearly all other species of strophanthus that have hitherto been examined yield the glucoside in an amorphous form. Prof. H. Thoms, assisted by Mannich, has prepared the glucoside from this new variety of strophanthus seeds, which he designates by the prefix of the letter "g" (= gratus), as *g-Strophanthin*, and describes it as follows: Handsome satin glistening plates, having the composition $C_{30}H_{46}O_{12} + 9H_2O$, which lose their water of crystallization at 130° completely, and then melt at 187° – 188° . Soluble (according to determination made by Biltz and Lucius) at 15° C. in 52,000 p. ether, 30,000 p. chloroform, 20,000 p. acetic ether, 30 p. ethyl alcohol, 30 p. amyl alcohol, or 100 p. water. In aqueous solution the glucoside shows an optical rotation at 20° (α)_D = $-30^\circ.8'$. With conc. sulphuric acid it forms a red color, which changes to green on addition of water, and a greenish-white flocculent deposit forms. The yield of the glucoside from the seed was 3.615 per cent. Physiological and clinical experiments made by Dr. H. Schedel, indicate its superiority as a heart tonic. The dose of *g-strophanthin* is 5 drops of a 1 per cent. aqueous solution, which may be, though rarely necessary, increased to 10 drops.—Apoth. Ztg., 19, No. 31 (April 16, 1904), 261–262; from Ber. d. d. Pharm. Ges., 1904, 90, 104 and 120.

India Rubber—New Sources.—In a recent issue of the "Agricultural Ledger" the results of the examination by Wyndham R. Dunstan of two rubbers, obtained respectively from *Willoughbeia edulis* and *Urceola esculenta*, are given. The first of these is not favorably reported on, but the second rubber, from

Urceola esculenta, is said to have shown good elasticity and tenacity, and contains 76.2 per cent. of caoutchouc and 7.0 of resin. These results show that the rubber is of a very fair quality, though the amount of insoluble matter is rather high. This, however, could be remedied to a large extent by more careful collection, so as to exclude vegetable débris. A sample of the rubber has been submitted for commercial valuation to brokers, who compare it with "Tonquin" rubber worth about 2s. or 2s. 1d. per lb.—Chem. & Drugg., Jan. 30, 1904, 188.

Rubber—Cultivation in Trinidad.—According to "Agricultural News" (II, 29, 166) no time has been lost in Trinidad in cultivating the valuable African rubber tree,

Funtumia Elastica.—Trees are now growing there four and a-half years old and 30 feet high, seeding freely, and from these excellent rubber, resembling that of Para, has been obtained. It is much more easily grown and worked than the *Castilloa elastica*, which is so commonly used in Central America for rubber culture, but yields, at the same age, a sticky and resinous unsalable rubber. The milk of the *Funtumia* readily coagulates on boiling, contains less albuminoids than that of the *Castilloa*, and a higher percentage of rubber.—Pharm. Journ., July 25, 1903, 104.

Gum Chicle—Experimental Data Concerning its Composition.—In view of the absence of information in the literature concerning the composition of the so-called "gum chicle," Frank O. Taylor has made some tests upon a sample purporting to be purified "gum," with results given below. These tests included determinations of ash, moisture, solubility in various solvents, acid value and saponification value. The ash, obtained by direct ignition, amounted to 0.2 per cent.; the moisture, 2.2 per cent.; soluble in chloroform, 82.7 per cent.; soluble in benzol, 84.7 per cent.; acid value, by Dieterich's method, 52 per cent.; saponification value, by Dieterich's method, 52 per cent.; ethers and esters were found to be absent. These figures refer to a gum devoid of adherent impurities, such as sand, fragments of wood, etc., and are not comparable to the impure crude product of the market.—Amer. Journ. Pharm., 75, No. 11 (Nov., 1903), 513-515.

ERICACEÆ.

Ledum Palustre—Yield and Character of Volatile Oil.—Lomidse has obtained by distillation from the young shoots of the flowering marsh wild rosemary, *Ledum palustre*, a yield of about 1 per cent. of viscid oil from which in course of time crystals were deposited. Complete separation of the crystals from the oil was not possible with 90 per cent. alcohol, better by distillation in vacuo at 20 Mm. and 80°(?). The liquid portion boiled from 282° to 286°, and contained a ketone of the formula $C_{12}H_{24}O$. The crystals remaining in the retort had the melting-point 106°, and boiled in an atmosphere of carbonic acid at 281°. Their composition was that of an alcohol $C_{13}H_{26}OH$. This body, which may possibly be identical with the already known ledum camphor, oxidized readily, but did not contain double linkings, as was proved by its behavior towards bromine.—Schimmel's Rep., April-May, 1904, 81; from Farmacy J., 42 (1903), 1037; through Chem. Ztg. Rep., 27, 1903, 284.

CAMPANULACEÆ.

Codonopsis Tangshen—A Source of the Ginseng Substitute "Tangshen." E. M. Holmes describes, among recent additions to the museum of the

Pharmaceutical Society, *Codonopsis tangshen*, which is the source of one of the varieties of the Chinese drug known as "Tangshen," and has recently been cultivated, with other rare Chinese plants, by Messrs. Veith & Son. According to Dr. A. Henry there is no question that this plant yields large quantities of "tangshen," which is, however, derived from different plants, and constitutes a very important Chinese drug, being used by the poor as a substitute for the costly ginseng. The drug is produced in the different provinces of Hupch, Szechuan, Shensi and Shansi, its name signifying "ginseng from the district of Shang Tang in Shansi." In the Tang district of Hupch large quantities of the wild-growing plant are dug up everywhere in the mountain, *C. tangshen* being the principal source, while the root of *C. lanceolata* is also collected, but yields an inferior article. Another variety is "Lutang," meaning "tangshen from the Luan prefecture of Shansi," which is perhaps derived from *Campanumæa pilosula*, this plant being also given as the source of the drug from Tientsin. Still another variety of the drug is known as "Ming Tan," produced in the province of Anhwei, the exact source of which is unknown, but Dr. Henry thinks will be proven to be an *Adenophora*.—Pharm. Journ., Nov. 14, 1903, 714.

COMPOSITÆ.

Anthemis Nobilis.—*Probable Cause of Waning Popularity*.—In a paper on the pharmacy of chamomile flowers, Professor Henry G. Greenish remarks that the flower heads of *Anthemis nobilis* have long enjoyed a high reputation as a bitter stomachic tonic, and this reputation they still possess in many parts of Great Britain and the Continent, where they are much used as a domestic remedy. They have, however, practically disappeared from medical practice, and it is a question whether this is not largely due, in the case of chamomile flowers as of other indigenous medicinal plants, to the introduction into the Pharmacopœia of preparations that failed to properly represent the drug from which they were made. Thus, for example,

Extractum Anthemidis, B. P., is made by boiling a pound of the flowers with a gallon of water until the volume is reduced to one-half, straining and pressing the liquid from the flowers, and evaporating this to a soft extract. It is quite evident that even with these quantities, under varying conditions the length of time during which the flowers are boiled must be more or less prolonged and necessarily the anthemic acid, the glucosidal bitter constituent, must be more or less destroyed; for the author finds that this glucoside not only readily reduces Fehling's Solution in the cold in the presence of mineral acids, but is readily decomposed when heated in aqueous solution, even in the absence of mineral acids. In accordance with these observations the author has endeavored to correct the pharmacy of chamomile flowers, and suggests a formula for a *fluid extract*, which see under "Pharmacy."—Pharm. Journ., Dec. 12, 1903, 878.

Artemisia Herba Alba—Percentage and Characters of Volatile Oil.—

E. Grimal finds that *Artemisia herba alba*, a composite very common in Algeria, contains 0.3 per cent. of a greenish-yellow essential oil with a camphoraceous taste and a very pleasant aromatic odor. It contains lævo- and dextro camphene, cineol, lævo-camphor, and the caprylic and capric esters of an undetermined terpene alcohol.—Pharm. Journ., May 7, 1904, 617; from Compt. rend., 138, 722.

Inula Viscosa, Desf.—Yield and Characters of Volatile Oil.—Schimmel Co. have obtained from 20.8 kilos of the (dried ? Rep.) herb of *Inula viscosa*, Desf., on distillation, 13 Gm. = 0.062 per cent. of a dark-brown volatile oil. The plant was received from, and is found throughout the Riviera; it is sticky to the touch, and fills the air with its resinous, balsamic odor. The odor of the oil, however, is not very pleasant. It is viscid, and deposits paraffin in abundance at the ordinary temperature. The fatty acids isolated from it were liquid. The sp. gr. of the oil at 25° C. was 1.006; acid number, 164.63; ester number, 15.77. The fresh leaves are used in popular medicine as a remedy in snake-bite, and in Euboea the fresh herb is added to wine, probably in order to impart to the latter the resinous taste which is much admired there. Another composite plant examined by the same firm is

Helichrysum Angustifolium, Sweet. This is a pleasantly odorous herb, widely distributed in southern Europe, where it covers extensive areas. It grows, for example, in heaps on the Monte Portofino, near Genoa, whence the material under examination was derived. By distillation, 20.2 kilos of the (dried ? Rep.) herb yielded 15.3 Gm. = 0.075 per cent. of a yellow-brown oil, of sp. gr. 0.9182 at 15° C.; $n_D^{20} = +0.40'$; acid number, 14.4; ester number, 118.16. In 90 per cent. alcohol it forms at first a clear solution, but this subsequently becomes cloudy, with abundant separation of a paraffin having the melting point 67° C.—Schimmel's Rep., Oct.—Nov., 1903, 76.

Lachnanthes Tinctoria—Medicinal Value.—George M. Beringer directs attention to the possible value of the wool flower, red root, or spirit weed (*Lachnanthes tinctoria*, Eli; *Gyrotheca capitata*, Walt.) as a medicinal agent, the drug having long been used by the Indian tribes of the southern states, especially the Seminoles of Florida, by homeopaths and others, and having more recently attracted some attention in England as a valuable remedy in the treatment of tuberculosis. The entire plant (which is indigenous to the Atlantic seaboard from Massachusetts to Florida) is used, though the root by itself has found specific application, principally as an invigorating tonic. It is a perennial herb, 1½ to 2½ feet high, the lower leaves equitant, the upper or stem leaves alternate, gradually reduced in size until at the top they become mere bracts. The roots are fibrous and have a bright red color; the flowers, in dense terminal cymous pani-

cles, are yellow and externally densely woolly; the capsule, three-valved, each cell containing about six disc-like seeds; the seed-coat contains a bright red coloring matter and an intensely bitter principle, while the entire plant, when chewed, colors the saliva yellowish-red, and leaves a decided acrid taste, which is probably due to calcium oxalate, but largely disappears on drying. Hence it is believed that a tincture of the fresh plant is the best form for the exhibition of this drug, and to this end the author gives a process for a *tincture of lachnanthis* which see under "Pharmacy."—Amer. Journ. Pharm., 76, No. 6 (June, 1904), 284-286.

Lactuca Virosa—*Absence of Mydriatic Alkaloid in the Plant*.—The announcement of T. S. Dymond some years ago that he had isolated hyoscyamine from "commercial specimens of extract of wild lettuce," as well as from a dried flowering plant (*Lactuca virosa*), induced J. V. Braithwaite and H. E. Stevenson to subject some fresh flowering herb of *Lactuca virosa*, collected at Hale End and Clingford, in Essex, to chemical examination with results that prove the absence of a mydriatic alkaloid in this plant even in such minute traces as will give the very delicate physiological reaction.—Trans. Brit. Pharm. Conf., 1903, 579-580.

Lactuca Virosa—*Confirmation of the Presence of a Mydriatic Alkaloid*.—In view of the contradictory results announced in the above paper of Braithwaite and Stevenson, the possibility that under the conditions of their experiments they might have easily overlooked an alkaloid if present only in exceedingly small quantity, and the evident care, definiteness and preciseness of Mr. Dymond's experiments, E. H. Farr and R. Wright have undertaken experiments upon the wild flowery plant supplied by Mr. Braithwaite, and a juice extract of the same, prepared according to the B. P. 1867, with results which clearly demonstrated the presence of an alkaloid, possessing mydriatic properties, in the herb of *lactuca virosa*. The following process was employed for the isolation of the alkaloid from the extract: Five grammes of the latter was weighed out and rubbed down in a mortar with enough slightly acidulated water to form a cream. Fifty cubic centimeters of absolute alcohol was added, the mixture well stirred and set aside until the mucilaginous matter had completely subsided. The liquid portion was poured off and filtered. The deposit was then rubbed to a cream with slightly acidulated water and the treatment with alcohol repeated. The two alcoholic filtrates were mixed, twenty cubic centimeters of distilled water added, and the mixture evaporated in a porcelain dish over a water-bath to small bulk. The residual liquor was transferred to a separator and the alkaloids shaken out with ammonia and chloroform, and purified in the usual manner. The product was a white crystalline residue weighing 1.4 milligrammes. It was dissolved in a little slightly acidulated water, and the solution gave alkaloidal reactions with Mayer's and Thresh's reagents, and, when instilled into the eye, produced a powerful mydriatic effect. The failure of Messrs. Braithwaite and

Stevenson to obtain any trace of alkaloid is probably due to the fact that they employed ether instead of chloroform in the shaking-out process.—Pharm. Journ., Feb. 13, 1904, 186.

Pyrethrum Flowers—*Analysis of Commercial Samples*.—Ferdinand Jean has analyzed several samples of pyrethrum flowers. The typical sample was produced from the flowers by himself, and of the others, only No. 1 was adulterated, chromate of lead and foreign woody fibre being found in it. He considers it important that a microscopic examination should always supplement the chemical analysis. The results are given in the following table :

	Type.	1	2	3	4
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Ash	8.9	7.5	10	8.7	9
Acidity (as H ₂ SO ₄).....	1	1	1.1	0.6	1
Alcohol-ether extract.....	24	24.9	30.5	21.9	24.4
Resins	9.3	8	13.8	9.4	11.1
Water-soluble	14.7	16.9	16.7	12.5	12.3
Iodine-value	3.9	7.7	5.2	3.1	5.8

—Chem. and Drugg., Sept. 12, 1903, 464 ; from Ann. de Chim. anal., 1903, 285.

Spilanthes Oleracea, Jacq.—*Chemical Constituents*.—Dr. Emil Gerber has subjected the herb of *Spilanthes oleracea*, Jacq., a Brazilian plant known by the common name “para-cress” which has found medicinal application in Europe (dating back to the 18th century) for a variety of purposes, but particularly as a remedy in toothache. Numerous examinations have been made to determine the nature of the active constituent, presumably a highly acrid crystalline substance, which Buchheim regards as identical with the “pyrethrin,” isolated from radix pyrethri. Dr. Gerber prepared an ethereal extract from the dry herb, by percolation, obtaining about 3.2 per cent. of extract. Subjecting this to distillation with steam, he obtained from 0.207 per cent. to 0.27 per cent.—calculated on the herb—of a faintly greenish oil, agreeable aromatic odor, and the characteristic acrid taste of the herb and extract prepared from it. This

Oil of Para-Cress has the sp. gr. 0.847 and an optical rotation, $\alpha_D = +1.85^\circ$. Subjected to fractionation, the principal fraction consists of a hydrocarbon, C₁₅H₃₀, which the author calls “spilanthene.” The oil, as obtained, owes its acidity to a body, which the author calls

Spilanthol, but which exists in it simply as an impurity, carried over mechanically with the water-vapor, the main part of the spilanthol remaining in the extract from which the oil has been distilled. Spilanthol is with difficulty obtained pure, being uncrystallizable. It was obtained in form

of a thick, syrupy liquid, of a reddish-brown color, faint peculiar odor and, at first, peculiar taste, followed by strong acidity. It is soluble readily in alcohol, ether, acetone, amyl alcohol, benzol, xylol, toluol, chloroform, carbon bisulphide, glacial acetic acid and ligroin, somewhat less soluble in petroleum ether, and practically insoluble in water, dilute acids and dilute alkalis. By the hydrolysis with hydrochloric acid or with alkali, a whitish base is obtained, which has an elementary composition corresponding to the formula $C_4H_{11}N$, but the identity of this base with other known bases of the same composition could not be established. Besides the volatile oil and spilanthol, the ethereal extract contains chlorophyll, fat and crystallizable "physosterin." The herb, after extraction with ether, yielded an alcoholic extract which, besides considerable quantities of *choline*, seemed to contain only unimportant constituents. The herb also contains considerable potassium nitrate.—Arch. d. Pharm., 241, No. 4 (July 11, 1903), 270-289.

VALERIANÆÆ.

Valerian—Changeability by Age.—M. Kochmann has investigated the changes that occur in valerian and its preparations in keeping. The fresh root contains no oil, this being formed during the process of drying through the influence of hydrolysis brought about, he asserts, by an oxydase present in the root. The fresh oil is yellowish to light-brown and has feeble acid reaction, the odor being characteristic but not exactly unpleasant. Old oil, on the other hand, is dark brown, reacts strongly acid, and has an exceedingly unpleasant odor. In the course of his experiments made upon a variety of preparations—the oil, tinctures, infusions, dialysates, and the chemically pure constituents of the oil—isovalerianic acid bornyl ester and valerianic acid diethylamide—he finds the substance most prone to change is the isovalerianic acid bornyl ester, which is the principal constituent of the volatile oil. The valerianic acid diethylamide remains neutral. The tinctures gave evidence of considerable and variable changes, while the dialysates prepared from the fresh drug retained their original condition unchanged. Infusion in all cases acquired decided acidity. The tinctures when exposed for ten days in open dishes showed no change in acid content. The bornyl ester of isovalerianic acid when exposed in the same way rapidly becomes strongly acid, particularly in the presence of water, this being probably the result of hydrolytic splitting into simple constituents.—Pharm. Ztg., 49, No. 4 (Jan. 13, 1904) 41.

Valerian—Constituents and Preparations.—In a careful study of valerian, Prof. P. Carles finds that the volatile oil exists in similar proportions in the root and rhizome, but very little in the rootlets, and that the oil of mature roots has an agreeable odor, that of the rhizome strong and camphoraceous, but that of the rootlets very little odor. He recommends, after removal of adherent soil, of which about 9 per cent. is usually pres-

ent, that the rootlets, which amount to about 3 per cent., should be cut off. An ethereal tincture contains the whole of the essential oil and resin present, but hardly any valerianic acid, the acid taken up being propionic. He considers the best preparation to be a fluid extract with 20 per cent. of alcohol, and 5 per cent. of ammonium, prepared by successive macerations. Percolation appears to break up the equilibrium between the active principles, and causes a precipitation of those which are removed in undue proportion. The resin appears to be intimately connected with the camphor and propionic acid. The camphor is a camphol or borneol, not an aldehyde. It is combined under the form of an ether, not only with the resin, but also with propionic, acetic and formic acids.—Pharm. Journ., Nov. 14, 1903, 701.

RUBIACEÆ.

Cinchona—*Cultivation in Africa*.—P. van der Wielen interestingly reviews the history of cinchona cultivation, beginning with the year 1849 when the tree was first introduced into Algiers from America. Since then it has been planted in numerous other parts of Africa with promising results—as Réunion, Teneriffe, Mauritius, Madagascar, Central Africa, and particularly in the Portuguese possessions where *Cinchona succirubra* has been extensively cultivated at elevations of 1,000 feet above the level of the ocean. In 1900, there were no less than two million trees under cultivation. A recent analysis of African bark has given the following results :

Bark of Trees :

	2½ years.	3 years.	4 years old.
Yielded quinine.....	4.083 per cent.	4.121 per cent.	4.756 per cent.
Yielded cinchonine ...	0.164 per cent.	0.224 per cent.	0.724 per cent.

The author, however, accords the greatest praise to the German cultivation experiments in the Cameroon, which are conducted with the seriousness of purpose and care so essential to the successful growth of cinchona under cultivation.—Pharm. Ztg., 49, No. 6 (Jan. 20, 1904), 59 ; from Pharm Weekbl., 1903, No. 50, 1065.

Cinchona Robusta—*Characters of the Bark*.—The bark of *Cinchona robusta*, which is the name by which the various hybrids of *C. officinalis* and *C. succirubra* are united under a common designation by Triemen, is the prominent subject of consideration in a "Contribution to the History of the Cinchona Trees," by Goras and Reimens, from which it appears that the cultivation of *Cinchona robusta* has languished for some years, owing to disappointments in alkaloidal yield, which, though large, consisted preponderatingly of cinchonine, or of proportions which rendered the separation of quinine difficult and circumstantial. The more modern appreciation of the therapeutic value of cinchonine, however, has led to an encouraging demand for this bark, and in view of this the author gives the

following description by which it may be distinguished from the cinchona barks: Externally, the bark appears dark-gray, in spite of light blotches here and there distributed in the epidermis. The cork layer is deep red, and separable with difficulty from the reddish-colored cellular layer beneath. It furthermore presents numerous, very large and striking transverse fissures, but is, on the other hand, devoid of the longitudinal fissures which occur in the other cinchona barks. The fracture is exceedingly fibrous, and the taste extraordinarily bitter. A transverse section shows a tolerably developed cork-tissue, and a cortical parenchyma comprising more than one-third of the bark. Tannin-containing or sclerenchymatous cells are not found in this tissue. The bark contains numerous single fibres, which are particularly numerous near the cambium. They are rarely found in groups, and, if so, these are never composed of more than five or six. They are exhibited in two distinct forms; very large ones and many smaller ones, which resemble the staff-cells of Berge (the fibre-cells of Schleiden), but have thickened walls. In its entire structure the bark resembles to some extent that of *C. succirubra*.—Pharm. Ztg., 49, No. 6 (Jan. 20, 1904), 58; from Bull. de Pharmacol., 1903, No. 11, 383.

Coffee—Comparative Exhaustion by Different Methods of Preparing the Beverage.—J. Katz records some interesting experiments undertaken with the object of ascertaining the caffeine content of the beverage prepared by different methods. He finds that most complete exhaustion of the coffee is accomplished by the use of Arndt's filter, which secures 96.5 per cent. of the caffeine content of the roasted coffee. Next in order comes the common method of infusion after the manner of preparing the official infusions, which secures 85.2 per cent. of caffeine; and, lastly, the beverage obtained by the coffee filters in common use, which secures only 60.3 per cent. of the available caffeine.—Arch. d. Pharm., 242, No. 1 (Jan. 31, 1904), 42-48.

Senoussi Coffee—A Variety Suitable for Cultivation in the Soudan.—A. Chevalier states that Senoussi coffee, the product of

Coffea Excelsa, succeeds well in the Soudanese zone, and that the seeds, when roasted, have a fine flavor. The plant is intermediate in character between *C. de Weveri*, Wildm. and Dur., of the Congo, and *C. Dybowskii*, Pierre, of Kemo, but differs in attaining the stature of a tree and in the form and dimensions of the leaves and the number of their nerves.—Pharm. Journ., Oct. 24, 1903, 577; from Rev. des Cult. Col., 13, 57.

Ipecacuanha—Sophistication by the Root of a Richardsonia.—E. M. Holmes calls attention to a "false ipecacuanha," recently offered in the London market, which proves to be the root of a species of *Richardsonia*, very similar in color to the true drug. Under the lens it shows the peculiar starch grains, acicular raphides, porous wood fibres, given as charac-

teristics of "undulated ipecacuanha" by Greenish & Colin ("Anatomical Atlas of Vegetable Powders"). These characters will serve to distinguish its presence in the powder of the genuine drug, from which porous vessels and wood fibres should be absent, their place being taken by tracheids. Under the lens the outer surface of the root is seen to be fissured transversely here and there, but to be without the raised rings or annulations, characteristic of ipecacuanha. Mr. Umney has confirmed the presence of a minute quantity of alkaloid, previously detected by other observers which he estimates at 0.12 per cent. in the spurious drug.—Pharm. Journ., May 21, 1904, 712.

Ipecacuanha—Alkaloidal Strength.—J. A. Hammond and L. E. Sayre have determined the alkaloid in three different samples of powdered ipecac by Keller's method and found them to contain, respectively, 2.04, 2.53 and 3.03 per cent. of alkaloid. The method of assay, which they describe, is easily carried out, and should, in their opinion, be adopted in the U. S. P.—Drugg. Circ., 47, No. 11 (Nov., 1903), 227.

Ipecacuanha—Comparison of Keller's and Paul and Cownley's Methods of Assay.—Much inconvenience has frequently resulted by the great divergence in the assay-value of ipecacuanha root in London and that supplied with parcels imported from the Continent. A paper which may throw some light on the point is published in the current issue of Messrs. Cæsar & Loretz's Report. They give the following interesting table showing the results obtained by Keller's process and that of Paul and Cownley :

	Keller.	Paul and Cownley.	
	Total Alkaloids.	Emetine.	Cephaeline.
Rio root	2.846	2.026	0.842
Rio root	2.297	1.355	0.984
Johore root.....	2.511	1.539	0.820
Cartagena root.....	2.875	1.544	1.389

These figures demonstrate that the analytical methods, both of which may be regarded as standard methods, give very closely agreeing results, so that the total alkaloids are correctly expressed by either method. It is therefore clear that the absurd results sent over from the Continent are not explainable by an honest difference in processes, and should be disregarded entirely.—Chem. & Drugg., Sept. 26, 1903; 550.

Powdered Ipecacuanha—Expeditious Method of Determination and Separation of Alkaloids.—A. G. C. Paterson, after a critical and experi-

mental review of the methods of Paul and Cownley, of Bird, and of Frerich (see Proceedings, 1903, 766-770), for the assay of ipecacuanha and the separation of the alkaloids, arrives at conclusions which lead him to recommend the following method as being accurate, quick and easy, and well adapted to small quantities (say 10 Gm.) of the powdered root: Agitate 10 Gm. of the powdered drug with 10 Cc. of ammonium solution (or 10 Cc. of sodium carbonate solution 1 : 3) and 120 Cc. of a menstruum, composed of 1 part of chloroform, 1 part of amyl alcohol, and 3 parts of ether, in a stoppered bottle during one hour. Then add from 10 to 15 Cc. of water in order to aggregate the powder; decant 100 Cc. of the ethereal liquid, evaporate it to one-half, and shake it out with 15 Cc. (or an excess) of $\frac{N}{10}$ hydrochloric acid, followed by three portions of 5 Cc. each of water. To the aqueous solution of the alkaloids so obtained now add an excess (about 2 Cc.) of normal potash solution, and shake it out with ether in four portions of 15, 10, 10 and 5 Cc. respectively, reserving both the ethereal and aqueous portions. Having mixed the ethereal solution, shake out three times with 10, 5 and 5 Cc. of $\frac{N}{10}$ potash solution, mix the latter and shake out with 10 Cc. of ether; then evaporate the ethereal solution, and weigh the residue as *Emetine* (or titrate it—1 Cc. $\frac{N}{10}$ acid = 0.0248 Gm. emetine). Finally, mix all the aqueous solutions, acidify with hydrochloric acid. Make alkaline with ammonia, and shake out with four portions of 20, 10, 10 and 5 Cc. of ether-chloroform (1 : 6); evaporate and weigh as *Cephaeline*. Instead of weighing the cephaeline it may also be titrated—the factor being 0.0234—using methyl-orange as indicator.—Pharm. Journ., July 18 and 25, 1903, 73-75 and 101-102.

Ipecacuanha—Value of Volumetric Estimation.—Referring to a recent paper of Edward Weiss (Zschr. Oest. Apoth. Ver., 1903, No. 21 and 22) in which he emphasizes the superiority of the gravimetric over the volumetric estimation of the alkaloidal content of ipecacuanha, G. Frehrichs calls attention to the fact that however reliable the gravimetric method proposed by Weiss may be in its application to unadulterated ipecacuanha powder, the powder may contain adulterants, such, for instance, as colophonium, which would inevitably appear in the residue of evaporation of the final ether extraction. Thus, operating on a mixture of 1 Gm. of colophonium and 5 Gm. of ipecacuanha by the method of Weiss, an apparent content of 3.15 per cent. of alkaloids was determined, whereas the sample of ipecacuanha used for the mixture contained in reality only 2.08 per cent. The recognition of such an adulterant microscopically, becomes impossible if the powder is mixed with an ethereal solution of the resin and the ether is evaporated, and becomes very difficult even if the adulterant is added in the form of very fine powder.—Apoth. Ztg., 48, No. 55 (July 11, 1903), 475-476.

Spermacoe Hispidæ, L.—A New Seed from Ceylon.—E. M. Holmes directs attention to the persistent importation at intervals during the last

two years of the seeds of *Spermacoce hispida* from Ceylon, which seems to point out that some use has been found for this drug which is not generally known. They are small brown seeds bearing a strong resemblance to coffee in shape, but are no larger than linseed. While no mention is made of these seeds in Trimen's list of medicines used in Ceylon, in "Pharmacographia Indica" (II, 230), they are said to be aphrodisiac and the plant to be prescribed to cure haemorrhoids. A German to whom the plants were shown remarked that they were used as a substitute for coffee in Germany. According to A. E. Bell they yield to ether an oil which seems to possess alkaloidal properties.—Pharm. Journ., April 9, 1904, 494.

Seeds of Spermacoce Hispida—Proximate Constituents.—Referring to Mr. Holmes' paper, David Hooper gives some additional information concerning the seed of *Spermacoce hispida*, which, some four years ago, he had opportunity to inspect and examine. They were said to exactly resemble coffee when roasted, and he was asked to investigate if they contained any injurious ingredients. They were contained in small, rounded capsules, and were oblong, granulate, opaque, brown in color, with an average length of 3.5 Mm. and breadth of 2 Mm. Although smaller in size they had the same shape as coffee seeds. The following was an analysis of a powdered sample:

Water	10.75
Fat	9.12
Albuminoids	12.44
Carbohydrates	37.76
Cellulose	23.23
Ash	6.70
	<hr/>
	100.00

An alcoholic extract contained a bitterish principle, giving the reactions for an alkaloid, an astringent substance affording a green color with ferric salts, and a yellow coloring matter turning orange with alkalis. These seeds, therefore, contain similar constituents to those found in coffee, and when roasted over a fire they develop an odor very closely resembling the well-known beverage. During the famine in India in 1877-78 the seeds of this plant, under the name of "*Dhoti*," were eaten in Bombay, and during the periods of scarcity, two and three years ago, the green portion of the plant was boiled and eaten as a pot-herb by the Santalis in Chota Nagpur, and by the poorer people in Monghyr, in the Bengal presidency. With this evidence we may conclude that *Spermacoce hispida* has no very potent medicinal properties, and as an occasional article of diet it may be regarded as not injurious.—Pharm. Journ., May 21, 1904, 699.

CAPRIFOLIACEÆ.

Golden-leaved Elder—*Reference to Sambucus Canadensis*.—While the golden-leaved elder of Europe is generally supposed to be a variety of *Sambucus nigra*, it is pointed out by A. D. Richardson that it is really a form of *S. canadensis*. It differs from the common elder in that the flowers have usually five and sometimes six stamens, sepals and segments to the corolla, whilst in *S. nigra* there are usually four in number; the leaves also have one more pair of leaflets, and the cymes are more cushion-shaped.—Pharm. Journ., Oct. 31, 1903, 614; from Gard. Chron., 34, 154.

UMBELLIFERÆ.

Conium Maculatum—*Distribution of Alkaloids in Different Parts of the Plant*.—With the object of contributing to the study of the distribution of the alkaloids in hemlock, E. H. Farr and R. Wright made a series of experiments covering a large number of determinations of the alkaloids in different parts of the plant, the great majority of the specimens operated upon having been collected by themselves. In dealing with this material for examination the following method was adopted: The collected drug was dried in warm air, the loss of weight being carefully noted. The average loss in drying was as follows: Roots, 77 per cent.; stems and stalks, 86 per cent.; leaves, 79 per cent.; flowers, 80 per cent.; fruit, 68 per cent. A weighed quantity of the dry material was taken, and, if possible, reduced to uniform powder, and exhausted by percolation with 70 per cent. alcohol. If the production of a uniform powder was not feasible, the drug was reduced to coarse powder and macerated for seven days in ten times its bulk of menstruum, a measured quantity of the tincture being taken for the estimation of the alkaloids by the following process: The tincture was placed in a porcelain dish, twenty-five cubic centimeters of distilled water containing one or two cubic centimeters normal sulphuric acid added, and the mixture evaporated over a water-bath until all the alcohol had been dissipated. The remaining liquid was transferred to a separator, the dish rinsed with five cubic centimeters of chloroform, the rinsings added to the contents of the separator, and the mixture shaken. The chloroform was drawn off and the process repeated. Any trace of alkaloid removed by the chloroform was recovered by agitation with a little acidulated water, the latter being afterwards separated and added to the original liquid. An excess of solution of potash was then added to the mixed acid liquids, and the alkaloids shaken out with three successive five cubic centimeters of chloroform. The chloroformic solutions were drawn off in turn and bulked, and the alkaloids extracted by agitation with three successive ten cubic centimeters of acidulated water. The process of purification above detailed was twice repeated, and the pure alkaloids obtained in chloroformic solution. The latter was well shaken with three drops of fuming hydrochloric acid, the mixture transferred to a flat-bottomed glass

dish, the last portions being rinsed out with a little absolute alcohol, the chloroform allowed to evaporate in a current of warm air, and the resulting hydrochlorides dried at a temperature not exceeding 90° C., until the weight was constant. The results are shown in the following table :

Stage of Development.	Source.	Roots.	Stems and Stalks.	Leaves.	Flowers and Peduncles.	Green Fruit.
Young plants, 4 to 6 in. high	Uckfield	0.047	0.017	0.030		
Plants, 4 ft. high, taken before flowering.....	Hitchin	0.022	0.019	0.120		
		(a) Cortex 0.031				
Plants, 3 ft. to 3 ft. 6 in. high, showing incipient inflorescence	Uckfield	(b) Axis 0.032	0.037	0.090		
Plants, 5 ft. high in full flower	Uckfield	0.050	0.064	0.187	0.236	0.906
Plants, 5 ft. high in full flower	Ashford (Derbys.)	0.018	0.012	0.075	0.086	(a) 0.725 (b) 0.975

—Pharm. Journ., Feb. 13, 1904, 185–186.

Conium Leaves—*Examination of Leaves Found in Admixtures*.—Dr. G. Modrakowski has examined the leaves which are sometimes found mixed with those of *Conium maculatum* in Germany, *e. g.*, *Charophyllum hirsutum*, *C. bulbosum*, *C. temulum*, *Anthriscus sylvestris*, *Æthusa cynapium*, and *Cicuta virosa*, and has pointed out a few characters by which they may be distinguished apart from the differences in the fruits, which are rarely met with in commercial samples. In *C. hirsutum* the leaf-stalk is almost round, although deeply channelled above, it shows only a flat rib in the upper surface. On transverse section the secretory cells have a large cavity. In *C. temulum* the secondary nerves of the leaf segments are formed at a more acute angle than in *C. hirsutum*, and the stem is spotted. Both species have hairy leaves. In *C. bulbosum* the hairs are less abundant than in the other two species, but longer. In *Anthriscus sylvestris* the leaves are slightly hairy, the leaf-stalks are hollow, and the secretory cells have but a small cavity. In *Æthusa cynapium* the transverse section of the leaf-stalk shows in its upper channelled surface a large central cell developed in the form of a trichome or hair from the central epidermal cell, and the terminal leaf segments show the palisade cells continued to the under surface. *Cicuta virosa* has distinctly serrate leaf segments and a hollow leaf-stalk, while the epidermal cells exhibit a striated cuticle.—Pharm. Journ., Feb. 13, 1904, 184; from Ztschr. (Ester. Apoth. Ver., 1903.

ARALIACEÆ.

Ginseng—*Cultivation in Corea*.—Mrs. Bishop, in a recent work on

"Corea," describes the method of cultivation and preparation of ginseng as witnessed by her when visiting several ginseng farms near Songdo, a city famous for its ginseng. All round Songdo are carefully fenced farms, on which ginseng is grown with great care and exquisite neatness, on beds 18 in. wide, 2 ft. high, and neatly bordered with slates. It is sown in April, transplanted in the following spring, and again in three years, into specially-prepared ground not recently cultivated, and which has not been used for ginseng culture for seven years. Up to the second year the plant has only two leaves; in the fourth year it is 6 in. high, with four leaves standing out at right angles with the stalk, and it reaches maturity in the sixth and seventh year. During its growth it is sheltered from both wind and sun by well-made reed roofs with blinds, which are raised or lowered as may be required. When the root is taken up it is known as white ginseng, and is bought by merchants who get it manufactured, about three and a-quarter catties of the fresh root making one catty of red, or commercial, ginseng. Every thing about the factories is scrupulously clean, and would do credit to European management. Here the ginseng root, designated as "beards" and "tails" to denote different parts of the root, which eventually has a grotesque resemblance to a headless man, is steamed for 24 hours in large earthen jars over iron pots built into furnaces, and then partially dried in a room kept at a high temperature by charcoal. The final drying is effected by exposing the roots in elevated flat baskets to the rays of the bright winter sun. The human resemblance survives these processes, but afterwards the "beards" and "tails," used chiefly in Corea, are cut off, and the trunk, from 3 in. to 4 in. long, looks like a piece of clouded amber. These trunks are carefully picked over, and, after being classified according to size, are neatly packed in small oblong baskets containing about five catties each, twelve or fourteen of these being packed in a basket, which is waterproofed, matted, stamped and sealed by the Agricultural Department as ready for exportation—Pharm. Journ., May 14, 1904, 652.

Ginseng—Cultivation and Preparation in Manchuria.—According to A. Hosie, of the British Consular Service, ginseng (*Panax ginseng*) is one of the most important drugs, and is indigenous to Manchuria, growing in the Kirin, especially in the Ch'ang pai Shan range, where the mountains are annually searched for the plants. The roots are not considered to be sufficiently matured until seven years old, the age being ascertained by the character of the leaves. Plants one year old are said to have only a three-partite leaf on a short stem; when two years old two similar leaves; when three years old the leaves are four-partite; in the fifth year the stem has a long stalk with several petioles, each with five-partite leaves. After this it flowers and fruits, throwing up a continuation of its stalk, crowned with an umbel, from the junction of the petioles. In Japan the plant is said to mature more rapidly, being ready for collection in the third or fourth year.

The young plant is transplanted (the transplanting being said to cause it to grow more rapidly) into a place where it will be under the eye of the cultivator. The transplanted roots form the second quality of the drug, the wild roots being the most esteemed. The largest quantity of Manchurian ginseng is, however, derived from seed, which is sown in narrow beds in the valleys among the mountains, and this constitutes the third quality. The seedlings are invariably transplanted when one year old. The matured roots are prepared in the following manner: They are thoroughly washed in cold water after being dug up, every particle of earth being removed with a soft brush, so as not to injure the epidermis. They are then of a yellowish-white color. The next process is to coat them, using a soft brush, with syrup of a treacly consistence, made by filling a rice bowl half full of clean sugar, either brown or white, according to the color to be imparted to the roots, and pouring boiling water on it. The roots are then laid on a piece of clean cloth, spread on top of a grating over a pot of boiling water, a wooden lid or cap being placed over all. The steam softens the roots, which absorb part of the sugar, and the rest finds its way into the boiling water, from which it crystallizes on cooling. It acquires a flavor of ginseng, and is sold as ginseng sugar at about a dollar a catty. The sugaring process is repeated several times, and when sufficiently sweetened the roots are spread on trays to dry in a moderate sun. The root loses two-thirds of its weight in the process, and remains softer than the Korean ginseng, which is nearly as hard as stone and very brittle. The upper portion of the root is usually marked with a series of fine parallel horizontal wrinkles or indentations, which indicate its age to a connoisseur, and these are imitated, when they do not exist in sufficient number, by winding a thread round the upper part of the root during the steaming process and removing it when the root is dried. The white ginseng is preferred in the southern provinces of China, Kwangtung, Kwangsi and Fukien, whereas the central provinces of Kiangsu, Anhui, Hupeh and Hunan prefer the red, so that for these last districts brown sugar is used in curing the roots. Korean ginseng has mostly a reddish tint, but whether this is due to ferruginous soil or is artificial is not known. Pharm. Journ., April 9, 1904, 497.

Ginseng—Cultivation in New York State.—The following concerning the cultivation of ginseng by a corporate company on a farm in Onondaga County, N. Y., where the first attempt was made on a large scale, may prove interesting. The practical man, who has had a long experience in ginseng growing, is James Ready. The method is extremely interesting, the ginseng being grown under a lattice-work which, while admitting plenty of light and air, keeps out the fierce rays of the sun which are so fatal to the plant. In stocking the farm, wild roots obtained from the Onondaga Indians and plants obtained from small growers throughout the state were used. Of the original 13,000 plants set out, about 8,000

bore berries this fall. These berries are nearly as large as a small pea, grow in clusters and are a bright red in color, and do not grow on plants less than three years old. When the berries are gathered, they are placed in sand and allowed to remain until the pulp decays, when the sand is sifted and the seeds extracted. The fresh seeds do not sprout for eighteen months. Some growers put the seed in the ground as soon as they are harvested; but the most approved way is to pack between layers of sand which is kept moist and stored in a cool place. In the following spring the seeds sprout, producing in the fall a small root two inches long which has a commercial value of from six to ten cents. The germinated seeds are worth twenty dollars a thousand. Wild roots and seeds which are yearly becoming more scarce, do not demand quite as high a price. The yearlings sell for four to six cents, while the seed retails at from ten dollars to fifteen dollars a thousand. The wild ginseng, which is becoming very scarce, is dark and dull in color, while the cultivated variety is white and grows much larger and faster. On being transplanted to cultivated gardens, the wild variety gradually bleaches out. The popular impression that wood dirt is necessary for the growth of ginseng has been found erroneous. The soil which the New York State Ginseng Company uses is a sandy loam. In planting, the yearlings are set about three inches apart, the medium-sized roots about six inches apart, while large varieties are set six inches apart in rows separated by a foot of space.—Pharm. Era., Nov. 12, 1903, 497.

Kilangit—An East Indian Fish Poison.—A fish poison in use in the Indian Archipelago, bearing the name of Kilangit, has been examined by H. W. Bettink and J. L. Heyl. The plant yielding it is supposed by Dr. M. Greshoff to be *Pohyscias nodosa*, an Araliaceous plant, but it is possible that more than one plant is used under this name. The leaves are usually reduced to coarse powder and mixed with wood ash and then thrown into the water. The leaves contain a body having the physical characters of a saponin, and when treated with dilute acid afford a sapogenin insoluble in water. This, with sulphuric acid, gives a purple coloration, which, in contact with bromine vapor, becomes violet. The leaf-stalks do not appear to contain any appreciable quantity of saponin.—Pharm. Journ., Oct. 17, 1903, 549; from Pharm. Weekblad, 40, 591.

ANONACEÆ.

Monodora Myristica, Dunal—Constituents of the Seeds.—Dr. H. Thoms has subjected the seeds of *Monodora myristica*, Dunal, to chemical examination. The plant abounds on the west coast of Africa, from Sierra Leone, through Upper Guinea, Cameroon, Gaboon, to Angola. The brown seeds are used by the natives, partly as spice and partly as medicine. They contain, in round numbers, 50 per cent. of ether-soluble substances, non-volatile at 97° C., having an acid number of 12.04, ester number, 148.66,

and saponification number, 160.7, together with a resinous mass, with difficulty soluble in cold alcohol, more readily in boiling alcohol, but even here incompletely. Benzol dissolves only small quantities, but the mass is nearly completely soluble in acetone. By steam distillation under pressure a yield of nearly 7 per cent. of

Volatile Oil was obtained. It had a yellow color, with green-yellow fluorescence, a very agreeable odor, and remained clear even when refrigerated. Its sp. gr. was 0.896 at 20° C., optical rotation $[\alpha]_D -64.16^\circ$, and it consisted essentially of *lævo limonen*, and an oxygenated body having the formula $C_{10}H_{16}O$; which is very probably identical with myristicol. Myristicin and other phenolic ethers, such as are found in oil of nutmeg and in oil of mace, were not found in the monodora oil.—Apoth. Ztg., 19, No. 10 (Feb. 3, 1904), 79; from Ber. d. d. pharm. Ges., 1904, No. 24.

Ylang-Ylang Trees—Cultivation in Réunion.—Some interesting information concerning the cultivation of ylang-ylang trees in Réunion, based on practical experience, is given by Flacourt. Both *Unona latifolia* and *Unona odorata*, which have now for a long time been grown as trees for avenues, are suitable for the cultivation. But an absolute necessity therefor are a tropical, tranquil climate, and a porous soil containing a certain amount of moisture. In order to grow the trees from seed, the latter, taken from the ripe, fleshy berries, must be freed carefully by repeated washing from all traces of pulp, and immediately after the last washing be placed in the seed-bed which may be laid out in a rich, well-manured soil. The germ-plants make their appearance after 40 to 60 days, and after 1 to 1½ months are planted out in nurseries which must be situated in a shady place. This planting out in nurseries in Réunion generally preceded by a process which consists of this, that the young germ-plants are placed singly in vessels of beaker-form, so-called "tentes," which can be readily constructed from the leaves of *Pandanus utilis*. The plants transposed in one or another manner, require about two months to attain a height of 25 to 30 Cm., and to develop sufficiently. At this stage the plants are best suited to the process of transferring to the plantations. During the next two years the latter must be tended with care, and yield nothing. From the third year on the trees begin to flower, and the crop can already be estimated at 150 to 200 francs per hectare (2½ acres). It is, however, necessary to see that the trees do not grow to a greater height than 2.5 to 3 M. This is done by cutting off the tops, which, at the same time causes a powerful development of the lateral branches and an abundant formation of blossoms, so that the yield becomes very remunerative. The flowering period of the trees commences in Réunion from January to February, but a regular formation of blossoms giving the best yield can only be reckoned upon from May to August. Those blossoms which are freshest when submitted to distillation yield oils of better quality. 50 to 60 kilos of freshly gathered blossoms produce 1 kilo oil = 1.56 to 2 per cent. The yield

from one hectare of plantation laid out according to Flacourt is annually from 3 to 4 kilos oil. Schimmel's Rep., April-May, 1904, 90; from Rev. des Cult. Colon, 13 (1903), 366, and 14 (1904), 16.

BERBERIDEÆ.

Zarishk—*A New Drug from Kurrachee*.—E. M. Holmes calls attention to a new drug recently received for the Museum of the Pharm. Soc. of Great Britain from Kurrachee, Northern India, under the name of "Zarishk." It consists of the fruits of one or more species of *Berberis*, probably

Berberis vulgaris and *B. lycium*, and is used in bilious complaints and as a febrifuge. It is described by Dr. Dymock in "Materia Medica of India (p. 26), and also by Dr. G. Watt in "Dist. Econ. Prod. India (I., 442).—Pharm. Journ., Nov. 14, 1903, 714.

Podophyllum—*Proximate Examination*.—James Thomas Moran gives the details of a proximate analysis of the rhizome of *Podophyllum peltatum*, which he summarizes as follows :

Moisture in air-dried drug	7.90 per cent.
Ash.....	2.60 " "
Organic matter	89.50 " "
	<hr/>
	100.00 " "

ORGANIC MATTER.

Resin	11.29 per cent.
Waxy matter.....	3.02 " "
Organic acids	2.15 " "
Sodium hydroxide extractive.....	49.15 " "
Cellulose	19.74 " "
Color extractive	4.15 " "
	<hr/>
	89.50 " "

—Merck's Rep., Aug., 1903, 218.

Podophyllum—*Percentage of Resin in Roots Collected at Different Periods of Growth*.—Willard Graham has determined the percentages of resin of podophyllin in mandrake roots collected during different periods of the year, with results as follows :

Marked.	Resin of Podophyllin.
Spring	6.03 per cent.
Spring	6.49 per cent.
Spring	6.13 per cent.
Not designated.....	5.79 per cent.
Not designated.....	3.90 per cent.
Not designated.....	3.87 per cent.
Not designated.....	4.01 per cent.
Winter	3.15 per cent.
Fall	4.25 per cent.

The percentage of resin in the Spring root is much higher than that collected at other times in the year.—Proc. Pa. Pharm. Assoc., 1903, 224.

Podophyllum Emodi—*Conflicting Statements Concerning the Activity of the Resin*.—D. B. Dott observes that the resin of Indian podophyllum (*Podophyllum emodi*) being official in the "Colonial Appendix," there is no reason why it should not be official in England, if it is true that it is equal in value to the resin of *Podophyllum peltatum*. He has, however, already on a previous occasion suggested that this subject still requires investigation, both on the chemical and pharmaceutical sides, and in the present paper again calls attention to conflicting statements concerning the chemistry of the two kinds of resin as well as regards their activity. Thus it is claimed in a recent letter by Mr. T. A. Henry, who in 1898, along with Dunstan, made an elaborate investigation of the subject, that the difference between the two resins is due to the fact that "the Indian resin contains from one and a half to three times as much podophyllotoxin as the American resin," and that Dr. Mackenzie (1898) has demonstrated "the greater activity of the Indian product." As podophyllotoxin is the chief active principle of the resin, it is naturally to be expected that such would be the case; but other experimenters claim results quite in conflict with this conclusion, and Mr. J. O. Braithwaite (1903), for instance, mentions three cases in which gradually increased doses of the *P. emodi* resin produced no effect, even when amounting to 3 grains. In view of such statements it can hardly be contended that the resin of *P. emodi* may prove a substitute for that of *P. peltatum*.—Pharm. Journ., Jan. 23, 1904, 84.

MENISPERMACEÆ.

Calumba Root—*Existence and Characters of Volatile Oil*.—In his Quarterly Report (January, 1904), Heinrich Haensel states that he has obtained a yield of 0.00568 per cent. Calumba-root oil is of dark-brown color, liquid at ordinary temperatures, and acid in reaction; its density is 0.9307 at 15° C. The oil appears to be optically inactive. On account of its dark color its optical behavior could only be observed in 5 per cent. alcoholic solution in 20 Mm. tube, and $a_D = +0$ was found. The acid number was determined to be 24, and the saponification number 54. Calumba-root oil dissolves easily in absolute and 96 per cent. alcohol; with more difficulty and with separation of brown, flocculent matter in 80 per cent. alcohol. Its odor is peculiar, distinct from all others, and its flavor bitter. Calumba-root oil has not hitherto been distilled, nor has it been mentioned as a constituent of the root, owing probably to the exceedingly small quantities present in the root.—Pharm. Journ., Feb. 20, 1904, 216.

RUTACEÆ.

Kô-sam Seeds—*Chemical Examination*.—Frederick B. Power and

Frederic H. Lees have subjected Kô-sam seeds, which during the past few years have been brought somewhat prominently to notice, on account of their reported value as a remedy for dysentery, to chemical examination. The name Kô-sam, by which these seeds are known, appears to be of Chinese origin, although in the medical literature of China and Cochin China it is sometimes written Khô-sam, signifying "gentian" in the language of the latter country. Kô-sam seeds are produced by

Brucea sumatrana, Roxb., a shrub growing about two meters in height and having a habitat extending from farther India through the Indian archipelago and Cochin China to Australia and the Philippines. All the parts of the plant are esteemed in the East Indies as a stomachic tonic, and are also used for diarrhœa, intermittent fever and worms. Kô-sam seeds have heretofore been examined by Professors Heckel and Schlagdenhauffen (1900), and shortly afterwards by Bertrand. The former obtained a bitter principle, which they describe as being identical with "quassin," and attribute to this the medicinal activity of the seeds, while Bertrand, also presuming the presence of "quassin," describes a second bitter principle, under the name of "kosamine," which he assumes to be the essential active principle of kô-sam seeds, and of a glucosidal nature, but fails to establish the latter character. The results of the present investigation of these seeds by Power and Lees confirm the presence of

Two Bitter Principles.—But neither of these, although requiring further investigation, are definitely shown not to be identical with "quassin," nor do they afford any justification of the statement of Bertrand respecting the glucosidal nature of a bitter principle which he has named "kosamine." One of these principles, designated (α), was obtained as an amorphous, light-colored powder, soluble in chloroform and sparingly so in ether, while the other (β), was insoluble in chloroform, and could only be obtained as a brown extract. The authors, furthermore, have determined that kô-sam seeds contain no alkaloid. They contain 1.8 per cent. of tannin; a fatty oil, in an amount equivalent to 20 per cent. of the seeds, consisting chiefly of the glycerides of oleic, linolic, stearic and palmitic acids, associated with a saturated hydrocarbon, "hentriacontane" ($C_{31}H_{64}$), and a crystalline substance, $C_{26}H_{44}O$, allied to the sterols, and agreeing in composition with quebrachol, cupreol, and cinchol. The combined alcoholic and petroleum extracts, furthermore, contain a small amount of an inconstantly boiling mixture of esters—probably of a butyric acid—and having the odor of the seeds, and, also, a very small amount of free formic acid. The seeds also contain a small amount of a hydrolytic enzyme. Finally, the authors express the opinion that a correct conclusion respecting the active principle of kô-sam seeds can only be formed when some definite constituent of them, such as the bitter principle (α), is tested clinically with reference to its value in the treatment of dysentery. —Trans. Brit. Pharm. Conf., 1903, 503-522.

False Cusparia Bark.—*Anatomical Characters and Chemical Constituents*.—A quantity of bark, supposed to be cusparia, having found its way into the London market during the year 1902, a sample was submitted by Mr. Holmes, Curator of the Museum of the Br. Pharm. Society, to Mr. Evelyn Wm. Pollard, who has made a histological and chemical examination of this bark by which he establishes its identity with a spurious bark, of unknown origin, found on the London market in 1894-5, and described by Barclay in his *Manual of Materia Medica*, from whom he obtained a sample for comparison. The present sample was supposed to be derived from *Angostura brasiliensis* or *Cusparia trifoliata* from Columbia. It had the following characters: In flat or slightly incurved pieces of varying length and width, and from one-sixteenth to one-eighth or rarely as much as three-eighths of an inch in thickness. The outer surface of a grey-brown color, rough from the presence of many wart-like excrescences of the periderm, and frequently bearing closely adherent lichens of a yellow or yellowish-red color, marked with numerous spots; beneath the corky layer the color is dark greenish-gray. The inner surface is coarsely striated longitudinally, and in color yellow, yellowish-brown, and brown. Fracture hard, brittle, showing numerous, closely-adherent concentric laminæ. A transverse section under the microscope shows numerous concentrically-arranged large groups of sclerenchymatous cells, upon which character the author lays particular stress, as well as upon the intensely bitter and slightly aromatic taste of the bark. Omitting the details of the histological characters, which are illustrated by numerous cuts, it may be mentioned that this false cusparia differs markedly from true angostura bark in having (1) well-developed sclerenchyma; (2) absence of raphides; (3) no special oil cells. The chemical examination, which is also given in detail, revealed the presence of: (1) a bitter amorphous alkaloid; (2) fixed and volatile oil; (3) abundant starch; (4) calcium oxalate. The chemistry of the bark, like the histology, is therefore entirely different from that of true angostura bark.—*Trans. Brit. Pharm. Conf.*, 1903, 523-530.

Guaiacum Officinale, L..—*Saponin Constituents*.—W. Friaboes, in a comprehensive prize essay on guaiacum preparations, contributes some interesting information concerning the saponin constituents of the wood, bark, leaves, etc., of *Guaiacum officinale, L.* The bark and wood contain two identical saponins, the one an acid, the second a neutral saponin. The leaves also contain an acid and a neutral saponin, but these are distinct from those contained in the wood and bark. The saponins contained in the twigs, to which the leaves are attached, being identical with those contained in the wood and bark, it is inferred that they are primarily formed in the leaves and fully developed in the twigs and stems. The saponins in the bark, splint and heartwood of the root are presumed to be identical with those contained in the bark and wood of the stem. While

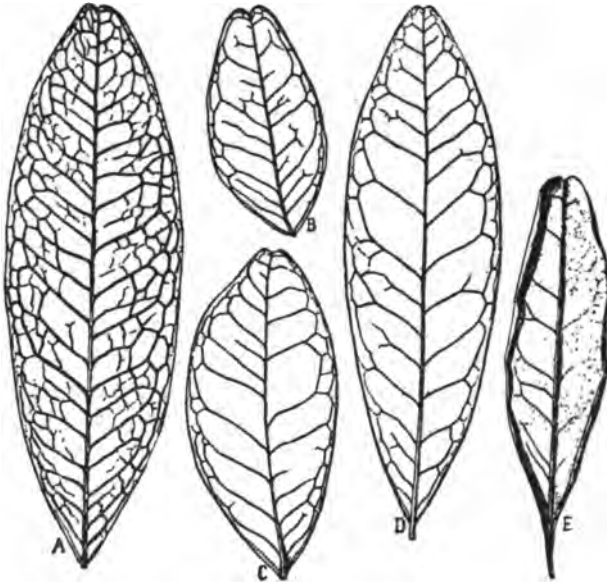
the *guaiaac-saponic acid* of the bark has the effect of stupefying fish, even in 0.05 per cent. solutions, it is non-toxic in its effect on warm-blooded animals. Its solvent action upon blood corpuscles is very faint. The *neutral guaiaac saponin* of the bark has no solvent effect on blood corpuscles at all, and is non-toxic, while the *guaiaac saponic acid* of the leaves has only very faint hæmolytic action, and is non-toxic on frogs when injected subcutaneously. The author, furthermore, finds that neither the root-bark or stem-bark contain resinous constituents, and that neither guaiaac resinic acid nor guaiaconic acid exert any toxic action. On the ground of the non-toxicity of these several constituents of *Guaiaecum officinale*, and the well-known diuretic effect produced by the use of infusions of the wood, the author considers that all parts of the plant may prove useful in the treatment of syphilis, and that its former reputation in this respect is justified. Similarly he finds that the wood of

Bulnesia Sarmienti, from which "guaiaac-wood oil" is obtained, contains a non-toxic saponin. He finds guaiaac-wood oil, as well as the "guajol" prepared from it, to be non-toxic to warm-blooded animals, though the oil when injected subcutaneously exerts toxic action on frogs. Therapeutically, the wood may with advantage be employed like that of *Guaiaecum officinale*.—Pharm. Ztg., 48, No. 62 (Aug. 5, 1903), 626.

Jaborandi Leaves—General Character Pertaining to all Varieties.—Dr. Henry H. Rusby contributes a highly interesting and valuable paper on commercial jaborandi, a drug which has caused more trouble and annoyance to buyers than almost any other drug on account of worthless varieties of pilocarpus leaves, as well as the leaves of other plants, which are offered as jaborandi. There are about fifteen species of *Pilocarpus* accepted by botanists, the leaves of five of which are important articles of commerce, while three others occur with less frequency. Two are in every respect worthy of confidence; the value of one is unknown, and the others are nearly or quite worthless—yet of the latter, one is official in the U. S. P., having been admitted at a time when knowledge concerning it was scanty. Besides these jaborandis, which are members of the genus *Pilocarpus*, a number of totally distinct drugs, called "jaborandi" in their native countries, occasionally reach the market, and there is at least one leaf, not at all related to *Pilocarpus*, either biologically or medicinally, which is used purely for purposes of sophistication. The author describes the commercial species of jaborandi in the order of their value, the special character of the five important varieties being shown in the accompanying cut (Fig. 57), and gives the following general characters pertaining to all pilocarpus leaves, as follows: They are unequally pinnate, that is, they terminate in a central leaflet. In a few species no lateral leaflets exist, the terminal one thus appearing like a simple leaf, except for its articulation, which reveals its true nature. In every bale some leaflets are found attached to their rachis; but most of them are detached, hence usually re-

garded by druggists as simple leaves. The leaflets are naturally of two forms in those species whose leaves consist of more than one leaflet. The terminal leaflet, being axial to the leaf, is equilateral, or, in common parlance, "equal." Its midrib divides it into approximately equal and similar halves. The lateral leaflets do not share in this character. The portion on the upper side of the midrib is shorter, and usually a little narrower, than that upon the lower, and a straight line drawn so as to touch the base upon the two sides of the midrib, or one similarly drawn across the terminal end, is not at right angles to the midrib; the summit and

FIG. 57.



Jaborandi leaves: A, Pernambuco; B, Maranhão; C, Aracati; D, Rio; E, Ceará.

Jaborandi Leaves.

base being thus, in common parlance, "unequal" or "oblique." The base of the leaflet may be rounded, acute or tapering; the summit is always emarginate or notched. The margin is entire, the surface smooth or hairy. When held against a strong light, transparent dots are visible, usually to the naked eye, always by the aid of an ordinary pocket magnifying glass. The plants are tropical American shrubs, the different species pretty closely localized in range. The flowers are small, in long, slender, spike-like racemes, and are followed by lobed fruits consisting normally of 5 one-seeded follicles, reminding one a little of those of prickly-ash. These fruits are occasionally found in the packages of leaves. It is said

that pilocarpus should be collected after the close of the rainy season, and that a scarcity of rain results in a decrease in the amount of alkaloid. The best variety of commercial jaborandi is

Pilocarpus Microphyllus, Stapf.—This yields the small-leaved jaborandi, known as "Maranham Jaborandi" (*B* in the cut), which contains nearly one per cent. of pilocarpine, with very little of the antagonistic alkaloid, and will be official in the forthcoming edition of the U. S. P. While this variety of jaborandi is designated as "Maranham Jaborandi," it is not definitely known where it is gathered. But one article resembling this drug occurs in commerce which is liable to be offered as a substitute. It consists of the leaflets of a species of *Swartzia*, of the family *Leguminosæ*. Next in value comes

Pilocarpus Jaborandi, Holmes, which yields the "Pernambuco Jaborandi" (*A* in the cut). This is nearly equal to "Maranham Jaborandi," and is one of the two varieties at present official in the U. S. P. The leaf is the largest, thickest, heaviest and most rigid of all the jaborandis, and is designated as "Large" or "Yellow-leaved Jaborandi." The most common adulterants and substitutes of this variety are the Rio and Paraguay varieties (see *D* in cut) which are supposed to be derived from *P. selloanus*, Engler; but if they are distinct, the name should be restricted to the Paraguay variety, and the Rio should be called *P. pennatifolius*, Lemaire. Another adulterant of "Pernambuco Jaborandi" is the so-called Maté or Paraguay tea, but this can only deceive the most careless. *P. pennatifolius* leaves contain probably not more than 0.2 per cent. of alkaloid. Next to "Pernambuco Jaborandi" in importance (commercially) is the leaf of

Pilocarpus trachylopus, Holmes, which yields the "Ceara," "Black" or "Velvety Jaborandi" (see *E* in cut). This is marketed on a rather extensive scale, and is at the time of writing (*sic*) the most abundant jaborandi of the market. Two other varieties considered by the author belong to the unifoliate, or so-called "simple-leaved" division. The one that is rather common in the market is produced by

Pilocarpus spicatus, St. Hil., is known as "Aracati Jaborandi" (see *C* in cut), and might with propriety be called "brown," or "stemmy jaborandi." The other variety is the product of

Pilocarpus racemosa, Vahl, known as "West Indian Jaborandi," which is said occasionally to reach our market, and is claimed to contain a large amount of alkaloid. This variety the author has never seen.—Bull. Pharm., Oct., 1903, 409-411.

Jaborandi Leaves—*Physiological Action of Alkaloidal Constituents*.—C. R. Marshall has made comprehensive investigations concerning the physiological activity of the alkaloids of jaborandi leaves, which the investigations of Jowett have shown to be three, namely: *pilocarpine*, *iso-*

pilocarpine, and *pilocarpidine*—and no others. The more important results of this research are summarized by the author as follows :

1. Jaborandi leaves contain three alkaloids—pilocarpine, iso-pilocarpine, and pilocarpidine. Iso-pilocarpine only occurs in small quantity. Pilocarpidine only in small amounts in *Pilocarpus jaborandi*, Holmes (Jowett).

2. No substance corresponding to jaborine has been found in the leaves either chemically (Jowett) or physiologically ; but a substance possessing an atropine-like action is present in the jaborine of Merck, which, however, consists mainly of pilocarpine or iso-pilocarpine.

3. Pilocarpine acts upon the so-called nerve-endings in the heart, and its action is comparable in nearly all points with that obtained by electrical stimulation of the vagi.

4. Small doses of pilocarpine increase the sensitiveness of the vagus to electrical stimulation. Large doses if injected during electrical stimulation of the vagus are practically without action.

5. A small dose of atropine is able to counteract for a definite time an excessive amount of pilocarpine. With efficient doses a proportion of 1 of atropine in 40 of pilocarpine can be demonstrated ; with large doses 1 of atropine in over 1,000 pilocarpine can be detected.

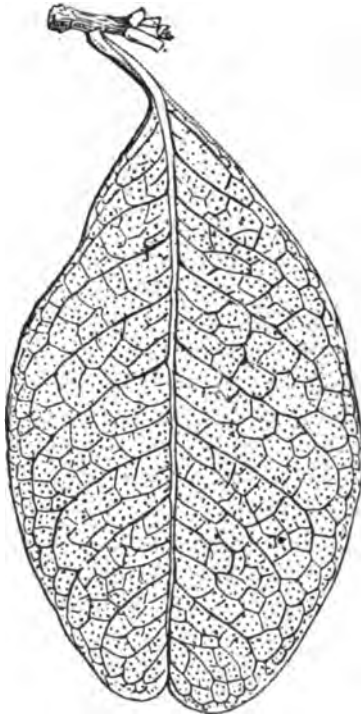
6. The antagonism of pilocarpine and atropine is physiological.

7. Iso-pilocarpine acts like a weak pilocarpine. In efficient doses it is about six times weaker. In large doses it is at least twenty times weaker.

8. Pilocarpidine acts like iso-pilocarpine, but is much weaker.

9. The homo-pilopic portion of the pilocarpine molecule acts at least as an interacting or haptophore group. Solutions containing the hydroxyacid corresponding to the lactone pilocarpine are inactive. The influence of the glyoxaline part of the molecule has not yet been determined.—Pharm. Journ., June 18, 1904, 827 ; from Journ. Physiol., May 31, 1904.

FIG. 58.



Jaborandi Leaf.

Guadeloupe Jaborandi—A New Variety.—E. M. Holmes calls attention to a new variety of jaborandi which has recently appeared on the London

market. In size the leaves are broader in proportion than those of *Pernambuco jaborandi*, and have the lateral veins similarly prominent on the upper surface, but they are as a rule more obovate in outline, and where they approach in shape those of the official drug, they are always larger and broader. The color is a purer green without the brownish tint so frequent in the leaflets of *Pilocarpus jaborandi*. The leaflets composing the new drug are evidently those of

Pilocarpus racemosus, the only species, except *P. heterophyllus*, which has simple as well as trifoliate leaves, but in the latter species the leaves are much smaller and different in shape, being nearly elliptical. In the accompanying cut (Fig. 58) a simple leaf of Guadeloupe jaborandi is shown in natural size. In the original paper two trifoliate leaves, the one having more acuminate and larger leaflets than the other, are also shown. *P. racemosus* is a native of the Antilles, and is fully described in the "Flora Phanerog. des Antilles Françaises" and in the Annales de l' Institute Coloniale de Marseilles (III, 1896).—Pharm. Journ., Nov. 14, 1903, 713.

Guadeloupe jaborandi—*Alkaloidal Content*.—Owing to some discrepancy in the statements made concerning the amount of alkaloid in Guadeloupe jaborandi, Dr. E. M. Holmes submitted a sample of these leaves for assay to Mr. A. J. Cowly, who found them to yield 0.6 per cent. of total alkaloids, which give about 50 per cent. of a crystalline nitrate melting at 155° C. According to Jowett, pure pilocarpine nitrate has a melting-point of 178° C., and anhydrous iso-pilocarpine nitrate of 159° C. It would seem, therefore, that the nitrate probably consists largely of iso-pilocarpine nitrate, or possibly of some other alkaloid. Iso-pilocarpine is estimated by Marshall to be only $\frac{1}{3}$ to $\frac{1}{7}$ of the strength of pilocarpine, physiologically.—Pharm. Journ., Jan. 16, 1904, 54.

Ruta Graveolens—*Constituents*.—In connection with his exhaustive study concerning the constitution of *rutin* from *Ruta graveolens* (which see under "Organic Chemistry"), N. Waliaschko has found opportunity to examine some of the other constituents of the plant. He finds that the alkaloidal body of Dragendorff, which was found only in small quantity, is not an alkaloid in the strict sense, but *choline*, forming a gold double salt containing 44.4 per cent. Au and 32.09 per cent. Cl. The strongly acid reaction of the aqueous extraction of rue is due to *rutic acid*, which was obtainable only in an amorphous condition. It is of a sticky, resinous consistence, and forms amorphous precipitates with silver, lead, barium, copper and zinc salts. Nothing of a positive character has been developed during the present examination concerning *ruta-resin* nor the *cumarin-like body* of Zwenger and Dronke. It seems probable that the latter is present in the form of a glucoside.—Arch. d. Pharm., 242, No. 4 (May 9, 1904), 252-254.

GERANIACEÆ.

Pelargonium Odoratissimum—Distribution of Constituents in the Plant.

—E. Charabot and G. Lalone have made experiments to ascertain the distribution of some organic substances in the geranium plant (*Pelargonium odoratissimum*). These have given the following results: the content of volatile acids diminishes from the leaf towards the stem. The stem and the leaf-stalks do not contain a trace of essential oil. The seat of the terpene compounds is exclusively in the leaves. This explains why the geranium flowers are odorless. It confirms at the same time the hypothesis that the essential oil, or at least the compounds from which it originates, are produced in the chlorophyll-containing organs of the plant and from there spread to the other parts of the plant, in which they then undergo more or less far-reaching changes. A distillation of 78.9 kilos geranium leaves by means of steam, yielded 130 grams oil. From the aqueous distillate (130 litres) additional 25 grams oil were extracted with ether. The properties of the two oils were as follows:

Oil separated from the distillate:	Water oil:
$d = 0.8979$	0.8930
$a_D = -11^{\circ} 02'$	$-5^{\circ} 13'$
acid number = 47	16.5
ester number = 16.6	6.7
ester-content = 7.0 per cent.	2.8 per cent. (calculated as geranyl tiglate)
alcohol-content = 70.7 per cent.	75.5 per cent. (calculated as $C_{10}H_{18}O$)
citronellol = 37.5 per cent.	30.6 per cent.
geraniol = 33.2 per cent.	46.9 per cent. (difference)
composition of } 53.0 per cent.	39.4 per cent. citronellol
the alcohol. portion } 47.0 per cent.	60.6 per cent. geraniol

A small quantity of aldehyde isolated from the water-oil with sodium bisulphite was recognized as citral.—Schimmel's Rep., Oct.-Nov., 1903, 40; from Compt. rend., 136 (1903), 1467.

STERCULIACEÆ.

Cocoa—Production and Use.—Wm. B. Marshall, in a comprehensive paper on the production and use of cocoa, speaking of the relative merits of coffee, tea and cocoa as table beverages, observes that, theoretically, cocoa should hold first rank, but in practice the order of rank is coffee first, tea second and cocoa third. They hold this relative rank in the quantity grown, in the commercial value, and in the frequency of use, notwithstanding the fact that nearly everybody likes cocoa from the very first time it is tasted, and that it is almost entirely free from the attacks to which coffee and tea are subjected by those who consider their use unhealthful. To compare the use of cocoa to the use of coffee and tea is somewhat like comparing cake to bread. Its appearance on the table at

intervals, even frequently, is hailed with delight, but, like cake, it has not been able to establish itself to any great extent as part of the regular diet, while tea and coffee, though of less pleasing taste, are wanted almost as regularly as bread. After describing the botanical relations and characters of the tree, its cultivation, the harvesting of the fruit, and the preparation of the seeds for the market, the author gives a very lucid description of the manufacture of the seeds into the various products known in commerce under the designations of cocoa and chocolate. While the machinery employed in the manufacture of these products would lead one to suppose that very complicated processes are involved, the reverse of this is true. Practically every step in the making of chocolate is simplicity itself, and the making of a loaf of bread involves as much, if not more, science. The essential steps are the following: roasting, crushing and winnowing to remove the outer shell and the husky matter which lines each twist and fold of the kernel; removing the hard germ or radicle; grinding to a paste; cooling. This gives "cocoa." If it is to be made into "sweet chocolate," the paste is flavored and sweetened. All the operations can be performed by hand, the earliest tools for this purpose having been simply a stone and pestle, or roller for crushing the roasted seeds to powder; but machinery has been developed to such an extent that the hand work is nearly restricted to stoking the fires and shifting the machinery that may be set to work on it. A nearer description of these operations being not generally available, the following may profitably find place here: When the beans are broken out of the bags, they are sifted, cleaned and sorted in order to remove foreign matter and unsound beans. They are then roasted in revolving cylinders, in which operation the flavor is greatly improved, and the shell and kernel become brittle, so that they are easily separated from each other, and the kernel is easily broken into small grains. The beans are then fed into a crusher, which breaks them into small pieces. As they fall from the crusher, a blast of air winnows out the hull and the tough linings of the folds. The small grains of pure cocoa and the hard germs fall together in one pile. The grains are known as cocoa nibs, or cracked cocoa, which some people prefer to buy because they feel assured that in this form there is no adulteration, but in the nibs they require further crushing and long boiling to prepare them for the table. In this form the cocoa contains all its oil, and makes an exceedingly rich beverage. After the germs are removed by a machine especially adapted to that purpose, the nibs are fed to heated mill-stones, or to grinding machines which work on much the same principle. In the grinding they are reduced to a thick paste, and not, as one would expect, to a powder. This is due to the great amount of oil which they contain and which the heat and friction soon turns into a fluid. During the grinding, a large part of the oil oozes from the machine, and is caught in drip-pans. It is a thick and creamy

liquid; but upon cooling, it hardens into a waxy solid of the color of manilla paper. This is the crude cocoa-butter of commerce. The cocoa paste then has some of the oil returned to it or some taken away, according to the degree of richness which the manufacturer wishes his product to have. The paste is then placed in pans, and the resulting cakes are the cocoa, or "plain chocolate," from which the beverage is made. When the cocoa is to be almost entirely free from oil, the paste is subjected to pressure, and the hard mass resulting therefrom is known as rock cocoa. Much of the caked cocoa is ground to powder and packed in tins, so that when it reaches the consumer it is in about the same condition as when it left the factory, and no grating is necessary to prepare it for infusing. The paste mentioned above, if it is to be made into the confection chocolate, is usually enriched by returning some or all of the oil, and is flavored with cinnamon or vanilla, sweetened, molded into cakes, cooled and wrapped in fancy papers. The gloss on the edges and one flat side of the cake is due to the contact of the chocolate with the molding pan, just as a cake of corn-mush is glossy wherever it has been in contact with the pan. After it is molded, the chocolate must be kept cool in order to retain its firmness and the gloss. On this account, the up-to-date chocolate factory is supplied with a refrigerating plant in order that the storage-rooms may be kept as cool as desired. Finally, in order to set at rest some confusion concerning the terms "cocoa" and "chocolate," the author observes that the tendency is to indicate all the manufactured forms of cocoa and also the beverage by the name of "chocolate." One of the larger cocoa and chocolate manufacturing firms has published the following definitions:

Cocoa.—The commercial name given (1) to the seeds of the small tropical tree known to botanists as *Theobroma cacao*; (2) to the cracked or coarsely-ground product of the roasted seeds, sometimes designated more particularly as "cocoa nibs" or "cracked cocoa;" (3) to the finely-pulverized product of the roasted seeds from which a portion of the fat has been removed, sometimes designated as "breakfast cocoa" or "powdered cocoa."

Chocolate.—(1) The solid or plastic mass produced by grinding to fineness the kernel of the roasted seeds of *Theobroma cacao* without removing any of the fat, sometimes called "plain chocolate" or "bitter chocolate;" (2) the same product to which have been added sugar and various flavoring substances, sometimes called "sweet chocolate" or "vanilla chocolate."

It is interesting here to note the tendency to interchange "o" and "a" in certain words. Thus "café" has become "coffee;" "Curaçao" has become "Curaçoa," and "cacao," which is the correct name for the seeds of *Theobroma cacao*, has become "cocoa," a term which leads to the further confusion of the terms *cocoa*, *coca* and *cocoanut*, which, though we know them to be widely different and distinct from each other, are by many people believed to be synonymous terms for one and the same sub-

stance. Regarding the commercial designations of cacao beans, these are usually derived from the country producing them, but the products of some countries are known by names otherwise derived. The Mexican is known as Mexican, or Soconusco; the Brazilian as Brazilian, Bahia or Maranham; the Venezuelan as Maracaibo or Caracas; the Ecuadorean and Peruvian as Esmeralda or Guayaquil; that of Guiana as Berbice. Ecuador grows and exports a larger quantity than any other country, and cocoa is perhaps her most important product. Trinidad comes next. Venezuela comes third. The African crop is growing in importance, and its export exceeds that of Venezuela and is approaching that of Trinidad.—*Amer. Journ. Pharm.*, 76, No. 2 (Febr., 1904), 55-66.

TILIACEÆ.

Tilia Europæa—*Chemistry of Flowers*.—P. Carles finds that linden flowers (from *Tilia europæa*) are rich in manganese and an oxydase, to the action of which the quantity of mucilage that the flowers yield appears to be due. The yield of this mucilage is much diminished if the flowers are heated to 100° C., at which temperature the oxydase is destroyed, and the same effect is produced by exposing them to light. In both cases the yellowish-green coloring matter becomes brown and brittle, and the odor diminishes. The distilled water, which contains oil, but not mucilage, is less esteemed.—*Pharm. Journ.*, May 21, 1904, 682; from *Pharm. Weekb.*, 41, 325.

Linden Bark—*Use in Burns*.—J. de Montmollon recommends a decoction of the inner bark of the linden tree, prepared in the proportion of 100 Gm. to 2 liters of water as fomentation in burns. The decoction is at first light brown and syrupy, but later becomes thin liquid and assumes a wine-red color. The fomentations must be applied as hot as can be borne, and must be frequently changed, even at night if the patient is awake. A linden branch, 1.5 m. long and 2 Cm. in diameter will yield about 100 Gm. of this bark.—*Pharm. Ztg.*, 48, No. 79 (October 3, 1903), 805.

TERNSTROEMIACEÆ.

Tea—*Analysis of Representative Commercial Sorts*.—Albert Pelleus has subjected twelve authentic and representative commercial sorts of tea to chemical and microscopical examination by methods explained in detail, which are designated with their port of shipment as follows: 1, "Ningchong Congo" (from Shanghai); 2, "Kintnan Congo" (from Shanghai); 3, "Tonchong" (from Fonchong); 4, "Pecco" (from Fonchong); 5, "Sonchong" (from Fonchong); 6, "Flowery Pecco" (from Fonchong); 7, "Java" (from Batavia); 8, "Ceylon Nanye Pecco" (from Colombo); 9, "Ceylon Pecco" (from Colombo); 10, "Indian Orange Pecco" (from Calcutta); 11, "Indian Pecco" (from Calcutta), and 12, "Imperial

(green)" (from Fonchong). The results obtained with the sorts designated under Nos. 1, 2, 3, 4, 5 and 6, under Nos. 7, 8 and 9, and under Nos. 10 and 11, conforming very closely with the types, Nos. 1, 7 and 10, respectively, these alone are given, along with those of No. 12, in the following table :

100 PARTS OF TEA CONTAINED :

TEA.	Moisture.	Tannin.	Aqueous.	Total Ash.	Water-Soluble Ash.	Thein.	Resin, Fat, Wax, Chlorophyll.	Remarks.
No. 1. "Ning-chon Congo" (Shanghai).	4.575	8.027	36.05	5.32	4.045	2.503	0.424	{ Pure leaves, much manganese.
No. 12. "Imperial" (Fonchong)	4.596	9.952	36.37	5.28	3.400	2.403	0.405	
No. 7. "Java" (Batavia) . . . }	4.580	9.704	42.75	5.05	3.150	2.533	0.427	{ Little manganese, leaf, many stems. Infusion becomes turbid on cooling.
No. 10. "Indian Orange Pecco" (Calcutta) }	4.576	9.436	42.75	5.42	3.520	2.213	0.378	{ Many leaf-stems, no manganese.
Average	4.581	9.280	39.48	5.26	3.529	2.413	0.485	
Eder's Constants.	—	7.5	30.0	6.4	2.0	1.0	—	

These results not only respond to the demands established for good tea, but materially exceed them, as shown by a comparison with "Eder's Constants" in the table. Two other samples, obtained in the local market, were also examined by the author, with results equally favorable as regards Eder's constants. None of the teas examined gave indication of artificial coloration. The ash of samples of tea containing manganese, in distinction from the teas grown on soils containing no manganese, is characterized by having a green color. It will be noted that the ash of Indian and Java teas is free from manganese, or, at most, contains only traces.—Pharm. Centralh., 44, No. 37 (Sept. 10, 1903), 605-610.

Tea Flowers—Utilisation as a Beverage.—Heretofore the hair derived from the manufacture of tea as a waste product has been introduced under the name of "flowers of tea." Recently, however, the flowers themselves have been introduced under that name—the forms being sold respectively under the names of green and black. The flowers are apparently gathered

two or three days before expansion. The mode of preparing tea, which has not so strong an aroma as that prepared from tea leaves, consists in pouring on cold water, then heating and boiling for ten minutes.—Pharm. Journ., Sept. 26, 1903, 453; from Journ. d'Agric. Trop., 3, 201.

Green Tea—A Remedy for Migraine when Smoked.—Fritz Netolitzky states that green tea, in form of cigarettes, has lately been smoked in England as a remedy for migraine. This therapeutical action he ascribes to the large proportion of caffeine contained in the smoke, which, estimated by Mulder's process, is sometimes as much as 1.6 per cent. on the weight of tea smoked. The author has analyzed a number of samples of these cigarettes, and has found that the alkaloid-content of the tea employed is usually about 0.4 per cent., with 0.9-1 per cent. of an essential oil of which about 0.2 per cent. occurs in the smoke. Traces of sulphuretted hydrogen, carbon dioxide and ammonia were also detected in the latter. To get the full benefit of these cigarettes it is recommended that they should be smoked slowly.—Chem. and Drugg., March 19, 1904, 460; from Ztschr. f. Unters. Nahr. u. Genussm., 6, 982-985.

VITACEÆ.

Grape Seeds—Use as an Adulterant of Pepper.—According to V. Paolini, grape seeds supply a new adulterant of pepper. The microscope reveals quite a difference in the appearance of the sclerenchyma of grape seeds, however, from that of pepper. A thick membrane almost fills the cells of this tissue in grape seeds, the sclerenchyma of which constitutes 10 per cent. of the total tissue. Other large cells are also present, containing crystals of calcium oxalate, and aggregations of the same crystals are also met with in the aleurone cells of the endosperm, while neither starch, oil or resin are present in the seeds.—Pharm. Journ., August 15, 1903, 269; from Ztschr. f. Untersuch. d. Nahr. u. Genussm., through Nature, 28, 216.

HIPPOCRATINÆ.

Gurjun Balsam—Nature of Constituents.—A. Tschirch and L. Weil have made a comprehensive investigation of the constituents of gurjun balsam, using as material various commercial sorts, as well as a balsam of known source collected in Java from *Dipterocarpus turbinatus*. Summarizing the results of this investigation, they state that the sediments which are occasionally formed in gurjun balsams contain large quantities of crystalline substances. These have the characters of phenols, and are colorless, and being insoluble in alkalis thus exhibit also the characters of resin. In Tschirch's "Harze and Harzbehälter," these bodies are distinguished by the name of "gurjuresinol." The presence of physosterins (cholesterins) has also been observed. On comparing the results of the present investigation with those communicated by former investigators, it is found that the preparations designated by the names of crystallized

copaivic acid, and meta-copaivic acid, in the price-lists of drug firms, are evidently derived from gurjun balsam, for they are perfectly indifferent in their behavior to alkalis, and therefore cannot be regarded as acids, and show close identity with the bodies isolated by the authors from gurjun bodies, as well as in some degree, among themselves. The authors conclude from their investigations that the gurjun balsams contain the following *neutral bodies* :

Gurjuresinol, $C_{15}H_{20}O$; crystallizable; identical with Hirshsohn's "Neural body," Keto's "Copaivic Acid" of commerce, and Mach's "Meta-cholesterol."

Gurjoresen, $C_{17}H_{28}O_2$; amorphous.

Gurjuturesinol, $C_{30}H_{40}O_2$; crystallizable; identical with Brix's "Copaivic Acid" from Merck and Trommsdorff's "Meta copaivic Acid."

The acid bodies contained in gurjun balsam are present in such insignificant quantities that they need not be taken into consideration.

As pointed out by Tschirch in his "Harze and Harzbehälter" (p. 258), *gurjuresinol* forms with *amyrin* a distinct class of resinols: the *resen-like resinols*, which are resin-alcohols that are insoluble in alkalis notwithstanding that they contain a hydroxyl group. Both bodies are probably also very closely related, since on doubling the formula of *gurjuresinol* the formula $C_{30}H_{40}O_2$ is obtained, which differs from the formula of *amyrin*, $C_{30}H_{40}O$, only by an H_2O . It is furthermore evident that *amyrin* and *gurjuresinol* are related to the coniferous resin acids, as shown on the one hand by the formula and the cholesterol reactions, and on the other by the similarity of products obtained by distillation with zinc dust.—Arch. d. Pharm., 241, No. 5 (July 31, 1903), 372-400.

ERYTHROXYLACEÆ.

Coca Leaves—Source of Commercial Varieties, their Histological Structure, Admixtures and Substitutes.—C. Hartwich contributes the results of a comprehensive study concerning the botanical sources of the commercial varieties of coca leaves, the general character and histological structure of the leaves of the species yielding them, as well as of other species of *Erythroxylum*, and of some possible admixtures or substitutes, the text of his highly interesting paper being illustrated by numerous engravings exhibiting the shape of the leaves and their histological features. The author concludes that Burck's species, *E. bolivianum*, in confirmation of the opinion expressed by Rusby, must be abandoned in favor of *Erythroxylon coca*, Lamarck; that the commercial variety of coca known as Bolivian is produced from this species, while the Peruvian or Truxillo variety of the drug is derived from *E. coca*, var. *spruceanum*, Burck. These two varieties are easily distinguished by their macroscopic characters. The Bolivian leaves vary considerably, both in size and shape, attaining as much as

9.5 Cm. in length, and being lanceolate, oval, oval-acuminate or obovate in outline. The ridge above the midrib, which was advanced by Burck as a particular feature of the Bolivian leaf, is well marked, but is not absent in the Peruvian leaves or in the leaves of other species, although not always so pronounced. The best means of distinguishing Bolivian leaves—the term “Bolivian” being applied by the author to the leaves of *E. coca*, Lam., from various sources, as “Bolivia,” “Huanuco,” “Cuzko” (these last two from Peru), “Huanta,” “Java” and “Ceylon”—is the presence in the spongy parenchyma of strongly thickened, but only slightly lignified, branching cells; these cells resemble the other cells of the spongy parenchyma in size and shape, differing only in the nature of the walls. The Peruvian (Truxillo) leaves are much more uniform in size and shape than the Bolivian, and the ridge above the midrib is not so conspicuous. The structure of the meristeles is in general the same as that of the Bolivian leaves, but the development of pericyclic fibres is usually less marked, while the sclerenchymatous idioblasts that characterize Bolivian leaves are absent in the Peruvian. These idioblasts are found in several species of *Erythroxylum*, but they differ in these from those of *E. Coca*, Lam., in being usually T-shaped, the leg of the T being inserted between the palisade cells, whilst the two arms are extended between the palisade and the epidermis. From an examination of the different species of *Erythroxylum* in the herbarium of the Polytechnikum of Zürich, the author has found a series of interesting peculiarities which will be consulted with benefit in the original paper. Concerning the alkaloidal value of the commercial kinds of coca, and leaving out of consideration an exceptional yield upon some young leaves of *E. Coca*, var. *spruceanum*, collected in June, it is shown that the drug derived from *E. Coca*, Lam., is the richest. Assays made at the request of the author by Dr. Panchaud, based upon the dried leaves, gave the following results :

Truxillo.	0.78	per cent.	} var. <i>spruceanum</i> .
Cusko	0.91	“	
Huanta.	0.859	“	} <i>typicum</i> .
Ceylon	0.83	“	

The cultivated young leaves from Java yielded 1.22 per cent.

In regard to substitutions and adulterations, the author briefly mentions that “cusko” coca has been found admixed with the leaves of an *Erythroxylum*, which appears to be closely related to *E. pulchrum*. In West Indian coca, the leaves of an unidentified plant have been observed, which in general resembled the leaves of the genus *Erythroxylum*, with the single exception that they contained oxalate glands, oxalate having heretofore been found in isolated crystals only in the coca leaves examined. Adulterants mentioned by the author are the leaves of *Theobroma cacao*, L. and those of *Dodonaea viscosa*, L., the so-called “Jana leaves” being

cultivated and used in Peru like coca leaves.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 617–630.

Bolivian and Truxillo Coca—Characters of Distinction.—Referring to the paper of Prof. Hartwich, Henry Geo. Greenish observes that he has devoted some attention to the comparative anatomy of commercial coca leaves, more particularly with the view of determining whether any definite means could be found of distinguishing the Bolivian from the Truxillo leaves in the crushed or powdered state, and that he has arrived at some conclusions which are not in all respects identical with those arrived at by Prof. Hartwich. Thus, the absence of the remarkable sclereids described by Prof. Hartwich as present in the Bolivian and absent in Truxillo leaves, cannot be relied upon as being indicative of the latter, since in an examination of fourteen samples of the leaves of *E. Coca* (*E. bolivianum*, Burck) of varying origin, three contained numerous sclereids, six contained a few, and in five none could be detected. Furthermore, the greater abundance of the pericyclic fibres of the midrib in the Bolivian than in the Truxillo leaves, is also a fallacious characteristic. Several leaves examined in this respect showed little difference. It is well known that commercial Truxillo leaves are easily distinguishable, macroscopically, from the Bolivian by their more broken appearance (among other things), and this is generally ascribed to a difference in thickness. He has measured the thickness in the intermural spaces of sections of a number of leaves, and found the average thickness of 13 Bolivian leaves to be 185μ ; of 8 Truxillo leaves, 171μ ; the thickest in each case being 225μ . He also found that leaves of the same size had the same thickness in both varieties, but that the larger leaves in any one specimen were thicker than the smaller, and this was true of both varieties. Hence it is scarcely in the relative thickness of the leaves that one can find an explanation of the greater fragility of the Truxillo leaf. Finally, the author finds that if the upper surface of a Bolivian leaf is examined with a lens it will be observed that even the smallest veinlets are distinctly prominent—much more so than the corresponding veinlets in the Truxillo leaf. If, now, sections made so as to cut these veinlets at right angles, best near and parallel to the margin, are examined under the microscope, it will be observed that the veinlets of the Bolivian leaf are connected with both upper and lower epidermises by a bridge of thick-walled lignified fibrous cells, whilst in those of the Truxillo leaf this mechanical tissue is much less developed. This character is constant and presents, the author thinks, a means by which the Bolivian leaves may be distinguished from the Truxillo. The strength thus imparted to these veinlets furnishes a sufficient explanation of the greater resisting power of the Bolivian leaves to destructive influences, hence they are less broken than the Truxillo. It is evident, therefore, that the Bolivian leaves require more mechanical support than the Truxillo, and they obtain this:

- (1) By the increased development of the line.
- (2) By the increased development of pericyclic fibres in the veinlets.
- (3) By the thickening and lignification of certain of the cells of the spongy parenchyma.—Pharm. Journ., April 9, 1904, 493-496.

Coca Leaves—Determination of Total Alkaloids.—E. L'ger recommends the following method for determining the total alkaloids in coca leaves: Having determined the amount of moisture in a small amount of the powdered leaves, a quantity of the same powder equivalent to 25 Gm. of the dried leaves is intimately mixed in a mortar with 5 Gm. of magnesia and 15 Cc. of distilled water. The mixture is introduced into a 1-liter wine-mouthed, glass-stoppered flask, and treated with 625 Cc. of ether, sp. gr. 0.721, saturated with water. The flask is then stoppered, tied down with a piece of cloth, well shaken up, and set aside for twelve hours, with frequent agitation. The whole is then shaken up, transferred to a filter, the filtrate collected in a 500-Cc. graduated flask, the funnel being covered with a glass plate during filtration. The 500 Cc. of filtrate thus collected, equivalent to 20 Gm. of dry powder, is distilled in several portions from a dry 250-Cc. flask by plunging the latter in warm water. The green residue is dissolved in 20 Cc. of neutral ether, 10 Cc. of $\frac{N}{10}$ hydrochloric acid, and 20 Cc. of water are added, the flask closed with a rubber stopper, and agitated. The whole contents are then transferred to a separator, and the acid liquid, after separation, withdrawn into a conical flask. The ether layer is then twice shaken out with 25 Cc. of distilled water, these washings being added to the acid liquid in the flask. This acid solution is filtered through a moistened double filter into a wide-mouthed glass-stoppered 500-Cc. flask, and the filter thoroughly washed through into the same. Sufficient distilled water is added to make up the volume to 150 Cc., when sufficient neutral ether to give a layer 1 Cm. deep is added. Five or six drops of 0.2 per cent. iodeosin solution are then added, and the amount of free acid titrated back in the usual manner with $\frac{N}{10}$ potassium hydrate solution. The number of Cc. of acid thus found to be combined with the coca alkaloids, multiplied by 0.1535, gives the percentage of these in the powder.—Pharm. Journ., April 30, 1904, 581; from Journ. Pharm. Chim. [6], 19, 334.

POLYGALACEÆ.

Polygala Amarella, Crantz—A Native of Britain.—E. M. Holmes having recently received a specimen of *Polygala amarella*, Crantz, for the Museum of the Pharmaceutical Society, mentions that this plant has recently been discovered by Mr. J. Cryer to be a native of Britain, occurring in a limited district of the mountain limestone, near Shipton, in Yorkshire. It has much resemblance to *P. calcarea*, but the flowers are smaller, and the lateral sepals are narrower than the capsule, which is rounded at the base, not suddenly narrowed, as in *P. calcarea*. The

plant is illustrated and described in the "Journal of Botany" (*X*, 41, 113, tab. 450).—Pharm. Journ., Nov. 14, 1903, 714.

FUMARIACEÆ.

Dicentra Formosa (Andr.) D. C.—*Alkaloidal Constituents*.—G. Heyl has isolated from the rhizomes of *Dicentra formosa*, besides the alkaloid *protopine*, heretofore determined in this rhizome by Battandier by its color reaction with concentrated sulphuric acid, two new alkaloids in the form of bromhydrates, which were separable from each other by the difference in their solubilities in water. The difficultly soluble bromhydrate was obtained in form of white, silky-glistening leaflets and yielded by treatment with alkali and shaking out with acetic ether and purified by repeated crystallization and treatment with animal charcoal, an

Alkaloid, *m. p.* 168.5°–169° C., in the form of shining, faintly yellowish needles, which show some reactions and characters identical with *homochelidonine*, isolated by E. Schmidt and his pupils from different Fumariaceæ and Papaveraceæ; but in others the new base shows sufficient divergence to justify the belief that it has not hitherto been isolated. The second base which forms a more soluble bromhydrate, may be designated as

Alkaloid, *m. p.* 142°–142.5° C.—This was obtained in the form of handsome white needles, which are very difficultly soluble in absolute ether. At first the author was inclined to believe this base to be identical with *chelidonine*, with which it possesses many characters in common; but, like the preceding base, it shows differences in others that point out a new alkaloid.—Arch. d. Pharm., 241, No. 4 (July 11, 1903), 313–320.

PAPAVERACEÆ.

Opium—Preparation in the Islands of the Pacific.—An "Ex-United States Soldier," who has been traveling in the islands of the southern Pacific Ocean for nearly three years, gives an interesting description, accompanied by illustrations, of the processes of gathering and preparing opium in the islands of the Philippine archipelago, Borneo, Gilbert's Island, Guam, etc., which may be consulted in Pharm. Era, Dec. 31, 1903, 679.

Opium—Cultivation in Persia.—According to M. Sangon, opium is cultivated throughout Persia, the best qualities being produced in Shiraz, Yezel, Kermanshab, Ispahan, and Kerman, the amount produced being about 12,000,000 kilos annually. A hectare of ground gives 6 kilos of opium and 12.15 quintals of poppy-heads.—Pharm. Journ., Jan. 16, 1904, 52; from Rev. des Cult. Colon., 13, 318.

Opium—Cultivation in Manchuria.—According to A. Hosie, of the British Consular Service, the opium poppy is cultivated throughout the whole of Manchuria, but the chief center of production and export is in

the south of the province of Hei Lung Chiang, to the north of the Sungari river, and the chief market for the drug is the city of K'uan ch'eng tzu or Ch'ang ch'un Fu, in the province of Kirin. The apparent reason for the more extensive cultivation of opium in the north is that opium, being less bulky and more valuable than cereals, can be carried at much less expense, and can be at once exchanged for ready money. There is a considerable demand for Manchurian opium in northern China, and agents visit Manchuria annually in the winter, avoiding the main roads and the taxing stations situated on them, and carry back the drug in small fast carts. It is also extensively smuggled, being readily concealed in the larger carts carrying produce. The poppy crop occupies the ground from March to July. The poppy-heads are scarified horizontally, and the sap collected as soon as exuded, and not left till the next morning, as is done in India and western China. Sufficient is grown for local wants, and to admit of considerable export by junks as well as by land.—Pharm. Journ., April 9, 1904, 497.

Opium—New Process of Morphine Assay.—The following process for the assay of morphine in opium, which is based to a certain extent on the Pharm. Germ. IV. method, is recommended by Philip Schidrowitz as being simpler and giving substantially different results: Six Gm. of opium, roughly powdered, is weighed into a small porcelain dish, 6 Cc. of distilled water added, and the whole allowed to stand for about fifteen minutes. The contents of the dish are then worked up to an even creamy consistency by means of an agate pestle, and are then transferred (by means of successive small quantities of water) to a 100-Cc. Erlenmeyer flask, the latter having been previously counterpoised. The total weight of opium and water is then made up to 54 grammes. The flask, after corking, is shaken vigorously for five minutes, and is then allowed to stand for one hour, with an occasional brief shaking. The contents are then filtered through a plain filter, 10 centimeters in diameter, into a second previously counterpoised 100-Cc. Erlenmeyer flask. If the filtrate does not run clear at first it must be returned to the filter. When exactly 42 grammes of filtrate have been collected filtration is stopped. Next add to the 42 grammes of filtrate exactly 2 grammes of a solution of salicylate of soda in water, containing 50 grammes of salicylate per 100 Cc. The whole is then shaken for about half a minute, and thereafter immediately filtered as before. Of the filtrate 36 grammes is collected, and to this is added 15 Cc. of ether, and, after rotating the flask once or twice, 5.2 Cc. of a solution of ammonia, prepared by mixing 17 grammes of ammonia (specific gravity 0.960) with 83 grammes of water. The whole is then vigorously shaken for ten minutes, and the flask and contents are subsequently kept for twenty-four hours at a temperature of 12° C. After this, as much of the ether as is possible is poured off through a filter of 8 centimeters in diameter, 15 Cc. of fresh ether is run into the flask, the latter

rotated briskly (but so as to avoid forming an emulsion), and the ether again poured off through the filter. After this the whole of the liquid is poured through the filter, the greater part (roughly two-thirds) of the crystals, however, being retained in the flask. The flask and filter are then washed with three lots of 5 Cc. each of water saturated with ether, and delivered from a pipette. Of each 5 Cc., 3 Cc. should be used to rinse the flask, and 2 Cc. run directly on to the filter. The filter with its contents is removed from the funnel, folded, and gently but firmly pressed between sheets of filter-paper. The filter is then opened, and the greater part of the crystals returned to the flask. Filter and flask are then placed in an air oven at 55° C. until dry. It is then perfectly easy to transfer the small quantity of crystals still adhering to the filter to the flask. Subsequently the crystals are dissolved in 25 Cc. $\frac{N}{10}$ H_2SO_4 , and the excess of acid titrated with $\frac{N}{10}$ alkali, using methyl orange as an indicator. It is preferable, prior to this titration, to dilute the liquid to roughly 50 Cc., and to fix the end-point by means of the droplet method. The percentage of morphine in the sample is then calculated as follows:

Let x = number of Cc. $\frac{N}{10}$ acid employed, then $x \times 0.7575 + \frac{1}{18}$ ($x \times 0.7575$) = per cent. morphine.

The results obtained by the process above described, and that according to which the greater part of the opium imported is assayed, are in excellent accord.—Pharm. Journ., May 21, 1904, 719; from the Analyst, Mar. 2, 1904.

Opium—Utility of Dieterich's Process for the Determination of Morphine.—Harold E. Matthews has conducted some experiments undertaken with the object of ascertaining the value of the method of E. Dieterich, published in "Helfenberger Annalen" for the determination of morphine in opium. The method is a very expeditious one, and consists essentially in a 15-minute digestion of the finely-powdered opium with water, filtering and washing to a definite volume, mixing a measured portion of the filtrate with a little ammonia, without shaking, but by rotation, and immediately filtering off the precipitated narcotine, which is thus almost completely removed. Ammonia in excess is then added, and the liquid shaken out with ethyl acetate, in several portions, to remove the last portion of narcotine—the morphine, which crystallizes out, being finally collected, dried and weighed under specific directions. The results of Mr. Matthews' experiments prove the process to possess considerable utility for the commercial estimation of the morphine value of samples of opium. It is, however, not quite as exact as the B. P. process, yielding a morphine which is less pure and smaller in total yield.—Trans. Brit. Pharm. Conf., 1903, 570-572.

Opium—Estimation of Morphine.—P. I. Aslanoglon gives the details of a method for the estimation of morphine in opium, which, while differing mainly in the manipulation from the B. P. method, is characterized by

making a correction for the amount of morphine held in solution in the solvent from which it is precipitated, the correction depending and varying on the time required for the operation and the temperature prevailing. This paper cannot profitably be condensed, and must therefore be consulted in the original, in Chem. News, Dec. 11, 1903, 286-287.

CRUCIFERÆ.

Mustard—Commercial Quality.—A. R. L. Dohme reports on an examination of four samples of mustard procured from department stores and grocers. Three of the samples were apparently pure mustard, containing from 5.6 to 6.3 per cent. of ash, but no starch, cornmeal, or other adulterant, while the fourth sample, designated "Mustard D Grocer, from his stock," contained 2.2 per cent. of ash and about 75 per cent. of starch colored with turmeric and made hot by the addition of a little capsicum. —Proc. Md. Pharm. Assoc., 1903, 72.

BIXINÆÆ.

Chaulmoogra Seeds—Constituents.—F. B. Power and F. H. Gornall state that the seeds which afford the chaulmoogra oil of commerce are not derived from *Gynocardia odorata*, as has until quite recently been assumed, but from

Taraktogenos Kurzii, King, a native of Burmah. The oil has been previously examined by Moss, by Petit, and, more recently, by Schindemeier, but their results differ in many respects from those obtained by the authors, which are given as follows: The seeds of *Taraktogenos Kurzii* (King) contain a hydrolytic enzyme, and also an unstable cyanogen compound, which reacts with the enzyme when the seeds are crushed, giving rise to hydrogen cyanide. Numerous attempts were made to isolate this compound, but without success. Further experiments will be made in this direction. On expression, the seeds yielded 30.9 per cent. of a fatty oil, which had the following constants: M. p. 22.33°C.; sp. gr. 0.951 at 25° and 0.940 at 45°C.; $[\alpha]_D^{15} + 52^\circ$; acid value, 23.9; saponification value, 213; iodine value, 103.2. On hydrolysis, the fatty oil yielded glycerol, a very small amount of phytosterol, $C_{26}H_{43}.OH$ (m. p. 132°C.), and a mixture of fatty acids (m. p. 44-45°C.; $[\alpha]_D + 52.6^\circ$ in chloroform; acid value, 215; iodine value, 103.2), which consisted chiefly of several homologous acids belonging to a series $C_nH_{2n-4}O_2$ containing a closed ring and one ethylenic linking, no member of which has hitherto been isolated from a fatty oil. The highest of these homologues present, which was isolated in a pure condition, separates from most of the usual organic solvents in glistening leaflets (m. p., 68°C.; b. p., 247-248°C./20 Mm., $[\alpha]_D + 56^\circ$), has the formula $C_{18}H_{32}O_2$, and is designated

Chaulmoogric Acid.—This combines with only two atomic proportions of bromine or iodine. Palmitic acid also was identified, and there is

reason for assuming the presence of a near homologue or homologues of chaulmoogric acid, but belonging to the series having the general formula $C_nH_{2n-4}O_2$ with two ethylenic linkings. Undecylic acid and hydroxy-acids were proved to be absent, and an individual acid corresponding with hypogæic acid could not be isolated. The "gynocardic acid" of all previous investigators is believed to be a mixture of several substances. The "press-cake" yielded, besides formic and acetic acids and a very small amount of volatile esters having the characteristic odor of the seeds, an appreciable amount of a neutral oily substance, $C_{18}H_{34}O_2$ (b. p., 214–215°/18 Mm., sp. gr., 0.9066 at 16°/16°, $[\alpha]_D + 42.4^\circ$), which is isomeric with chaulmoogric acid.—Pharm. Journ., June 18, 1904, 831.

Oleum Gynocardia—Comparison of Authentic and Commercial Samples.

—Having observed differences in the behavior of two samples of chaulmoogra oil to solvents, etc., Ed. Hirschsohn procured at different times some additional commercial samples and subjected them to comparative examination with three samples prepared direct from gynocardia seeds: No. 1, prepared by cold expression, No. 2, expressed warm, and No. 3, extracted with petroleum-ether. These oils when first prepared were perfectly clear, but in a short time became turbid and granular in consistence. The odor was the same as that of the commercial oils. The yield, calculated for the original seed, amounted to 40.25 per cent., and amounted to 62 per cent. of the decorticated seeds used. The melting-points of these pure oils varied between 26° and 28° C., while those of the commercial samples, designated as A, C and D, ranged from 28° to 30°, the fourth sample, B, melting, however, at 50° C. The author describes the solubilities of these oils and tabulates the constants, obtained by the usual methods, as follows:

Designation of Sample.	Acid Number.	Saponification Number.	Iodine Number.
No. 1. Cold pressed	26.84	205.55	99.50
No. 2. Warm pressed.	25.54	210.07	96.80
No. 3. Extracted with petroleum ether ..	21.14	198.88	98.36
A. Commercial oil	87.33	253.07	69.70
B. " "	34.44	95.60	33.97
C. " "	70.66	207.14	88.01
D. " "	37.60	198.40	96.38

—Pharm. Centralh., 44, No. 38 (Sept. 17, 1903), 627–628.

Gynocardia Oil—Characters and Constants.—J. Schindelmeier de-

scribes gynocardia (chaulmoogra) oil, obtained by cold expression from the seeds, as a firm, yellowish mass, throughout which crystalline fatty bodies are distributed. It melted at 26° C., and remained fluid at 20° C. for about 15 minutes. It is soluble in a large quantity of alcohol, and forms turbid solutions with absolute ether, chloroform, tetrachlormethane, carbon bisulphide, petroleum ether and ligroin, small flakes separating from the last two solvents after a short time. Its acid number was 25.04, saponification number 232.42, iodine number 92.45. A 35.71 per cent. solution of the oil in petroleum ether showed a rotation of $[\alpha]_D^{20} + 10^{\circ} 28'$. The acetyl number of the fatty acids was 207.8, the iodine number 110.8. The author's investigations, furthermore, shows that

Gynocardic Acid is a member of the fatty-acid series $C_nH_{2n-2}O_2$, and that it probably has the formula $C_{21}H_{40}O_2$.—Apoth. Ztg., 19, No. 36 (May 4, 1904), 306; from Ber. d. d. pharm. Ges., 1904, 164.

CISTÆ.

Cistus Monspelienensis and *C. Salviifolius*.—*Yield and Characters of Volatile Oils*.—Schimmel & Co. have distilled the volatile oils from two fragrant species of *Cistus*, derived from the Mediterranean region of Spain. Both oils are distinguished by an odor like ambergris, resembling in this respect an oil which this firm produced a long time ago from "Ladanum," the resin of another species of *Cistus*. The yield of oil from *Cistus monspeliensis* was 0.015 per cent. It was light brown and separates off between 20° and 25° C. abundant quantities of a paraffin, melting at 64° C. The sp. gr. of the oil is 0.9786 at 15° ; optical rotation, $+ 1^{\circ} 40'$; acid number, 15.7; ester number, 31.51. *Cistus salviifolius* yielded 0.024 per cent. of a yellowish-green oil, which behaves like the preceding oil with regard to the separation of paraffin. Its sp. gr. at 15° is 0.9736; $a_D = + 17^{\circ} 20'$; acid number, 16.86; ester number, 22.73.—Schimmel's Rep., Oct. / Nov., 1903, 77.

Ladanum.—*Mode of Collection, Composition, &c.*—E. Weiss gives an account of the collection of ladanum in Crete and the results of a chemical examination of authentic specimens. The drug appears to be collected by the inhabitants of a few Cretan villages only, by beating the shrubs with a sort of rake to which leather straps are attached; the resinous secretion adheres to the straps and can afterwards be removed. A skillful collector can gather in this way about a kilogramme in a day. Microscopical examination of a sample showed the presence of the characteristic secretion hairs of *Cistus creticus*. It yielded 53.69 per cent. of resin, 2.9 per cent. of volatile substances, and 23.6 per cent. of ash. The resin soluble in alcohol yielded an acid number, 63.52, ester number, 98.93; and saponification number, 162.45.—Pharm. Post, 37 (1904), 277.

VIOLACEÆ.

Viola Tricolor—*Presence of a Glucoside Producing Methyl Salicylate*.—Induced by a botanical study on the common pansy, *Viola tricolor*, by H. Krämer, in which it was stated that the fresh sprouting buds, when rubbed between the fingers, emitted the odor of wintergreen oil, Schimmel & Co. distilled a fairly large quantity of the fresh flowering plant, and obtained an essential oil which had a strong odor like wintergreen oil, and which consisted almost entirely of methyl salicylate, as was proved by the examination. A. Desmoulière, who appears to have had no knowledge of this previous examination, now makes the same observation, and finds, further, that methyl salicylate is not present as such in the pansy, but, as in the case of *Betula lenta* and other plants, occurs in the form of glucoside, which in the presence of water, under the influence of a ferment, is split up into methyl ester of salicylic acid and grape-sugar. He has succeeded in separating a glucoside, which both on heating with dilute sulphuric acid, and by the action of the ferment contained in the plant, splits off methyl salicylate. This glucoside, which is undoubtedly identical with gaultherin, could only be obtained in amorphous form, whilst the ferment (betulase or gaultherase) was not isolated at all. From the fact that the odor of wintergreen oil only occurs when the herb is rubbed, Desmoulière concludes that the glucoside and the ferment are contained in different cells of the plant, and solely for this reason were unable to act previously on each other. It is probable that in the other *Violaceæ* the same conditions prevail, but Desmoulière has as yet confirmed this only for the cultivated pansy.—Schimmel's Rep., April-May, 1904, 88; from Journ. Pharm. Chem. (6), 19 (1904), 121.

CARYOPHYLLACEÆ.

Herniaria Glabra—*Constituents*.—Grein contributes some further information concerning the constituents of *Herniaria glabra*, and more particularly concerning the active constituent, herniarin, which he has succeeded in obtaining in a pure condition. The constituents heretofore determined besides this glyceride, are paronychin, saponin and tannins, but are not considered to be therapeutically important. Herniarin was obtained in the form of colorless crystals, insoluble in ether, but readily soluble in absolute alcohol. It melts at 228° – 231° C., has the composition $C_{44}H_{40}O_{19}$, and is hydrolyzed on heating with water to form a new body, which the author assumes to be an acid, and names

Herniaric Acid, $C_{28}H_{26}O_{14}$, and believes to be the real active constituent on which the diuretic effect of *Herniaria glabra* depends. The herniarin has been obtained from different samples of the drug in variable and small quantities, the largest yield being 0.18 per cent., the smallest 0.09 per cent.—Pharm. Ztg., 49, No. 25 (March 26, 1904), 257.

CUCURBITACEÆ.

Colocynth—Percentage of Oil in the Pulp.—To insure the absence of seeds from colocynth pulp, the B. P. requires that it should yield only a trace of fixed oil when treated with ether. E. Dowzard, however, finds that pure colocynth pulp yields about 3 per cent. of soluble matter when extracted with ether, the greater part of which is colocynthin, the active principle, and that to make an accurate determination of the oil of colocynth, redistilled petroleum ether should be used. Thus, he obtained from two samples of pulp freed from seeds 3.5 and 3.1 per cent. of ether extract; from a third sample, by means of petroleum ether, only 1.16 per cent. of extract, and from the pulp so extracted 2.75 per cent. of soluble matter was subsequently extracted by ether. Five other samples yielded direct to petroleum ether 0.52, 0.58, 0.60, 0.98, 1.20 and 1.33 per cent., these figures being obtained in an examination of large batches of powdered colocynth.—Pharm. Journ., Sept. 12, 1903, 400.

The South African "Gift Apple"—Botanical Relation, Etc.—D. H. Davies gives some information concerning the "gift apple" of South Africa, the word "gift" being the Dutch for "poison." The plant has come

FIG. 59.



South African "Gift Apple."

under the author's notice in many districts of South Africa, to which it is indigenous, and is to be met with in the hedges along the roadsides; and being within the reach of children, is frequently the cause of death when inadvertently eaten. Investigations by the author, of the plant and fruit, which is shown by Fig. 59, trying to gain definite information, has met with little result. It belongs to the *Cucurbitaceæ*, and he has satisfied himself that it is a species of wild colocynth. The fruit is a small apple,

weighing about 1 oz. or $1\frac{1}{2}$ oz. when fully matured; turning first from green into yellow, then black, finally drying up inside, leaving the outer shell perfectly empty. The surface thus naturally becomes quite bleached in the sun into a grey color, so that in the winter, when the plant is devoid of its leaves, all that remains is the dried shell of the apple, which seldom falls off until the autumn. It possesses a most acrid and poisonous juice, which, when accidentally squirted into the eye, has been known to produce severe inflammation. The plant grows to a height of from 1 to 3 feet, but in shady places and against a support, such as the end of a house, to a height of quite 6 feet.—Chem. and Drugg., April 30, 1904, 696.

LOASEÆ.

Damiana.—*General Use as Tea in Mexico*.—John Uri Lloyd, after giving a general description of the drug known as damiana which is derived from *Turnera aphrodisiaca*, concludes as follows: Damiana is a Mexican shrub, its habitat being on the peninsula of Lower California, inland from La Paz. It was introduced to American medicine under a misunderstanding of its nature. It is not a Mexican drug, but a general beverage. Its qualities reside in a fragrant leaf, yielding to hot water a pleasant, harmless, tea-like beverage which, so far as history determines, has been consumed from all time by the Mexicans, and is still so employed by all classes, men, women and children alike. It is a gentle stimulant or tonic, kindly in action, pleasant to the taste, and acceptable to the stomach. Its medicinal qualities are mainly restricted, in Mexico, to cases where a gentle stimulant may be effectual, as in suppressed menses, in which it is desirable to administer a hot drink in connection with a grateful aromatic that will not disturb the stomach. In other words, damiana is a homely, domestic remedy, innocent of the attributes under which, in American medicine, it has, for a quarter of a century, been forced to masquerade. Its American field is now restricted, but in its true position the use of damiana may be broadened. A freshly-made tea of prime, recent damiana herb, when it can be procured, is perhaps the most desirable form of administration, or a concentrated cordial representative of the drug, of exceptional freshness and of prime quality, palatable as possible, made to carry the full qualities of damiana.—Pharm. Rev., 22, No. 4 (April, 1904), 126-130.

PASSIFLOREÆ.

Carica Papaya.—*Cultivation and Preparation of Papain*.—The fact that a small and remunerative industry in dried pawpaw-juice has existed for several years at Montserrat has been the cause of the revival of the interest in the cultivation of the paw-paw (*Carica papaya*) and the preparation of papain. It is stated in the "Agricultural News" that the trees are usually self-sown, growing among rocks on the mountain-side, or else

are planted around the houses of the peasantry, who collect the juice in calabashes, in which a small quantity of water is first placed. To obtain the juice the rind of the fruit is lightly scored with a bone or wooden knife, or some similar instrument. As the juice falls into the water it thickens to the consistency of ice-cream, and in this state it is sold to the manufacturer. There are two varieties under cultivation—the long- and the round-fruited. With regard to the respective merits of these, experience has shown that the long-fruited variety bears earlier and nearer the ground, both of which are strong points in its favor. It is, however, claimed that the round variety gives the larger quantity of juice. This may be true; but, as the latter grows to a considerable height, the cost of collecting the juice is greatly increased in the case of old trees. With regard to the quantity of juice that can be collected in a given time, it is stated that one of the student-gardeners at the Agricultural Station, where the trees are plentiful, collected on an average 4 oz. of juice per hour. Concerning the preparation of commercial papain, the Hon. F. Watts describing the process adopted in the West Indies, remarks that this preparation is a comparatively easy matter, provided that attention is paid to certain details. In collecting the juice he observes that after a time the flow diminishes from the incision, the liquid coagulating around it, and this is carefully removed with the knife and placed in the cup with the milk. The fruit is not removed from the tree, and may be subjected to the operation of tapping several times at intervals of two or three days. It is essential that no iron knife or iron utensil should be brought in contact with the milk; wood or bone should be employed, and the milk should be collected in earthenware basins or cups, or in glass vessels—not in tins, which are sure to blacken it. After collecting, the juice soon becomes coagulated, and it should then be in the form of a snow-white curd possessing a somewhat pungent, but not putrid smell. It speedily decomposes if not rapidly dried, and when decomposing it emits a most unpleasant odor; consequently the drying should be effected as speedily as possible. When considerable quantities are being prepared, the juice or milk should be collected in the early morning, and the drying should begin before midday. This insures that by evening the material is in a sufficiently dry condition to keep out deterioration until the following morning, when the drying can be completed. This may be effected in several ways. In dry, hot weather the coagulated milk may be placed in thin layers on sheets of glass and exposed to the sun. This plan, however, is rarely satisfactory on a large scale, and it is best to adopt some form of drying-apparatus. Drying is well effected by spreading the coagulated milk on drying frames made by stretching brown linen on light wooden frames, somewhat like those used for framing school slates. These frames may be of any suitable size to fit the drying-apparatus employed. A small American fruit-dryer answers very well, or a drying-stove may be constructed by

building in brick a chamber about 3 feet high, 3 feet wide, and 6 feet long. It is all important that the temperature at which the drying is effected be as low as possible, and if this can be done below 100° F., so much the better. The drying must be continued until the substance is crisp and in such a condition that it can be reduced to a fine powder without any difficulty being experienced from stickiness. The dried material should be finely pulverized, when the resulting product should be a white or cream-colored powder, with a characteristic, but not putrid smell. The powder should be packed in tins or bottles and carefully preserved from contact with the air.—Chem. and Drugg., Jan. 30, 1904, 185.

MYRTACEÆ.

Barringtonia Speciosa, Gaertn.—*Chemistry of the Seeds*.—W. P. H. van den Driesten Maresuw has subjected the seeds of *Barringtonia speciosa*, Gaertn., to chemical examination. The tree yielding these seeds is indigenous to the Indo-Malayan coast regions, being found on the outer edges, close to and bordering the shore, but is found also in Australia, Polynesia and Africa, being known under a variety of native names, and botanically also under the names *Mitraria commersini*, Gmelin, and *Butonica rumphiana*, Miers. The peculiar fruit, a large sapless berry, contains a single seed enveloped in a fibrous mass. It is egg-shaped, of a brown color, about 6 Cm. long, and in the largest sample 4 Cm. broad. Being copiously covered on the exterior with tough fibrous strands, it floats readily, and is frequently found in the drift along the Indian and Polynesian shores. The seeds are longitudinally provided with four deeply-indented furrows. When dry they are exceedingly hard and difficult to powder. They contain an abundance of starch granules, reminding in some degree of those of Brazilian arrow root (*Manihot utilissima*). By means of petroleum ether, the seeds dried at 105° C., 2.9 per cent. of a yellow fixed oil was extracted, which yielded nothing to water or diluted hydrochloric acid, and evidently contained neither alkaloid nor glucoside. From the residue the author extracted by methods given in detail the following constituents: *Gallic acid*, 0.54 per cent.; a non-glucosidal body, *barringtonogenetin*, having the composition $C_{16}H_{21}(OH)_8$, forming minute colorless crystals, and amounting to 1.082 per cent.; a glucoside, *barringtonin*, amounting to 3.271 per cent., and *ash* amounting to 2.42 per cent. The glucoside,

Barringtonin has the formula $C_{18}H_{28}O_{10}$. It is a saponin and a powerful cardiac poison; is colorless and amorphous, and yields by hydrolysis with mineral acids sugar and a new substance, *barringtonogenin*.—Schw. Woch. f. Ch. u. Pharm., 41, Nos. 36 and 37 (Sept. 5 and 12, 1903), 423 and 435.

Eucalyptus—*Species Successfully Grown in the United States*.—In a review of some valuable monographs on the genus *Eucalyptus* that have appeared during the past year—by J. H. Maiden, by Baker and Smith, and by Alfred James McClatchie—Professor Henry Kraemer points out

that when the late Baron F. von Mueller prophesied that this genus would "play a prominent part for all time to come in sylvan culture of vast tracts of the globe," he probably little realized that in twenty-five years after the publication of his classical work "*Eucalyptographia*," it would already be the most extensively cultivated genus of forest trees, and also recognized to be the most valuable. Omitting here much generally interesting information presented in this review, it is of particular interest to American readers to know that over forty species of *Eucalyptus* have been successfully grown in the United States, among them no less than eight yielding oil containing over 40 per cent. of eucalyptol, and that the various eucalypti which are growing and fruiting at the present time in the United States serve the following uses: Forest cover, windbreaks, shade, fuel, posts, railway ties and other underground purposes, piles, street-paving, telegraph poles, ship-building, vehicle-making, agricultural implements, furniture and cabinet-making, &c. A large number of species are also enumerated as being a useful source of either oil, kino, or honey, and it is interesting to note in this connection that the oil of *Eucalyptus globulus* is the same in character and constituents, no matter where the trees are grown.—Amer. Journ. Pharm., 76, No. 4 (April, 1904), 177-182.

Eucalyptus Calycogona, Turcz.—*Varieties Formerly Regarded as Species*.—In his critical revision of the "Genus *Eucalyptus*," J. H. Maiden deals with *E. calycogona*, Turcz, characterized by the angularity of the calyx tube, of which he enumerates two varieties, viz., (1) var. *celastroides*, Maiden, including *E. celastroides*, Turcz, and *E. fruticetorum*, F. v. Müll., and (2) var. *gracilis*, including *E. gracilis*, F. v. Müll., *E. gracilis*, var. *brevisflora*, Benth., and *E. yilgarnensis*, Diel. These varieties were formerly regarded as species. As doubtful varieties of *E. calycogona*, he mentions *E. gracilis*, F. v. Müll., var. *Thozetiana*, F. v. M., and *E. ochrophloia*, F. v. Müll. Mr. Maiden's critical remarks concerning allied species will be useful to systematic botanists, but it is not clear from the context how far he has depended on a knowledge of the living plants, or whether he has based his present classification merely on dried specimens. Baker and Smith give the characters of the oil of *E. calycogona* as specific gravity at 15° C., 0.9098; specific rotation + 1.48; saponification number, 6.17; solubility in alcohol, 1 volume, 80 per cent. Constituents found, pinene, eucalyptol, aromadendral.—Pharm. Journ., Nov. 7, 1903, 661.

Pomegranate Bark—*Determination of Total Alkaloids*.—E. Léger gives the following method for the determination of total alkaloids in pomegranate bark: 20 Gm. of the bark is powdered and passed through a fine sieve. The moisture is determined in 0.5 Gm. of the powder. A quantity of this, equivalent to 15 Gm. of dry powder, is intimately mixed, in a mortar, with 5 Gm. of magnesia and 10 Cc. of distilled water. The mixture is placed in a 500-Cc. flask, corked up and set aside for two hours; 150

Cc. of chloroform is then added, and the weight of the flask and its contents noted. The flask is then fitted to a reflux condenser and boiled for an hour. After cooling, the original weight is adjusted by the addition of more chloroform, and, after mixing, the whole is thrown on a filter, the filtrate being collected in a graduated 100-Cc. flask and the funnel being covered with a glass plate during filtration. The 100 Cc. of filtrate thus collected, equivalent to 10 Gm. of the dried bark, is distilled in two portions from a 125-Cc. flask until 80 Cc. of distillate have been collected. The residual concentrated chloroformic extract is transferred to a separator, the distillation flask washed out with 40 Cc. of neutral ether, employed in two portions, and added to the chloroform-extract. To this ether-chloroform solution 10 Cc. of $\frac{N}{10}$ hydrochloric acid is added, and the whole shaken out after adding about 20 Cc. of water. The acid-aqueous extract is run out into a glass-stoppered 250-Cc. flask, and the ether-chloroform extract again shaken out with two successive 30 Cc. of water, these washings being added to the first separated acid liquid in the flask. Sufficient neutral ether is then added to the acid-aqueous extract to form a layer about 1 Cm. deep. Five drops of 0.2 per cent. alcoholic solution of iodeosin are then added, and the amount of free acid titrated back with $\frac{N}{10}$ potassium hydrate solution until, after vigorous shaking, the aqueous layer shows a pale rose tint. The number of Cc. thus used subtracted from 10, the number of Cc. of $\frac{N}{10}$ hydrochloric acid solution first added, gives the amount of that acid used up by the alkaloids of the bark. The number of Cc. thus combined $+ 0.1475$ gives the percentage of total alkaloids. This should not be less than 0.25 per cent. To obtain the neutral ether necessary for the determination, ether, sp. gr. 721, is shaken out with water containing a little $\frac{N}{10}$ potassium hydrate, which is then neutralized with $\frac{N}{10}$ hydrochloric acid, using iodeosin as the indicator. The standard solutions, too, should be set by titration against each other with the same indicator.—Pharm. Journ., April 30, 1904, 581; from Journ. Pharm. Chim. [6], 19, 329.

SALICACEÆ.

Barks of the Salicaceæ—Comparative Anatomy.—One of the most interesting studies contributed at the meeting of the British Pharmaceutical Conference in 1903, is that of Pierre Elie Felix Perrédès on the comparative anatomy of the barks of the salicaceæ, this comprehensive study having evidently been undertaken with the object of throwing further light upon the variations in the occurrence of salicin and salinigrin in different willow and poplar barks, to which H. A. D. Jowett and C. E. Potter drew attention in a paper read before the "Conference" in 1902 (see Proceedings, 1903, 972). In this paper it was shown that differences of species were not the only factors to be considered in ascertaining the probable yield of glucosides by these barks. Nevertheless, the factor of species is one of considerable importance, as shown, for example, by the

fact that *Salix discolor* yields salinigrin instead of salicin, while manufacturers of salicin state that *Salix veriminalis* never yields any glucoside. The addition, if possible, of diagnostic characters gleaned from a study of the anatomy of the bark of the different species of the salicaceæ, and more especially of the willows, cannot fail, therefore, to be of value; the more particularly, when it is considered that the manufacturer or the pharmacist seldom has anything but the bark itself to guide him in its identification. In the present paper, which is designated as "Part I," the general anatomical features of the barks in the natural order are considered under the following headings: (1) The Epidermis and the Tissues Derived from the Phellogen. (2) Cortex. (3) The Region of the Pericycle. (4) The Bast. This is followed by a description of the systematic examination of the following poplar barks: *Populus tremuloides*; *P. alba*; *P. grandidentata*; *P. canescens*; *P. tremula*; *P. balsamifera*; *P. angustifolia*; *P. deltoides*; *P. pyramidalis*; and *P. fremonti*. In this section the salient features of the barks are first described *seriatim*, preceded in each case by a statement of the locality and date of collection, and of the authority responsible for the determination; the whole being concluded by the construction of a key for the entire series, and accompanied by six plate engravings in illustration of the text—plate I exhibiting conventional signs which are essential to a correct understanding of the figures.—Trans. Brit. Pharm. Conf., 1903, 442-474.

Salix—*Distinctive Appellations and Uses of Different Species*.—Referring to the investigation of Dr. Jowett, in which it was shown that the percentage of salicin in willow bark varies considerably according to the time of year at which the bark is gathered, and even according to the sex of the tree (see Proceedings, 1903), Dr. E. M. Holmes observes that little information concerning willow bark is found in works on materia medica, and still less concerning the varieties from which salicin is commercially obtained. Inquiries made with the object of obtaining some precise information on these points, though not entirely satisfactory in result, have, nevertheless, elicited some interesting information which he has communicated in a paper presented to the British Pharmaceutical Conference (1903). Different species of the genus *Salix* are known respectively as willows, osiers and sallows. The term

Willow is generally applied to the species that form trees even when they are pollarded close to the ground, and grow as shoots or osiers, 6 to 9 feet long. The tree willows in cultivation are three in number. The first is *Salix alba*, the white willow, the white wood of which is used for various articles of utility, among these chip boxes for druggists' use, etc. The second species, *S. fragilis*, called the crack or snap willow, on account of the ease with which the branches break from the stem in spring time, was formerly called the red willow, because of the red color of the wood. But this name is now confined to a hybrid of *S. purpurea* and

S. viminalis, called *S. rubra*, the bark of which is known in Belgium by the name of "rood scorce," i. e., "red bark." The third tree willow is *S. triandra*, and this, with its hybrids and varieties, is the willow principally grown in England in form of shoots or osiers for basket work.

Osiers are more numerous than the tree willows, although the term osier is especially applied to forms and hybrids of the species

Salix viminalis, which grow readily into long rods or shoots almost without lateral branches. The true osiers are chiefly used for hampers and brown wicker-work, and are not usually peeled. Other osiers are *S. vitellina*, used largely by English market-gardeners for binding celery and other vegetables into bundles; *S. purpurea*, the hybrid of which with *S. viminalis*, and known as *S. rubra*, has upright long shoots, and is one of the finest, toughest and most pliable of the osiers, and one of the whitest when peeled; *S. acutifolia*, a quick-growing species, known as the Russian or Caspian willow, which produces long rods; and *S. pentandra*, a species growing wild in the north of England, and sometimes used for coarse basket-work. The name

Sallow is given to willows that have a shrubby growth, and more or less broad, downy leaves. With regard to the utility of the bark of the several species of *Salix* mentioned, as a source of salicin, the author observes that neither *S. viminalis*, *S. vitellina*, nor *S. triandra* contain salicin and are consequently not considered; *S. pentandra*, which contains salicin, is not usually peeled. The hybrid, *S. rubra*, on the other hand, is used extensively on the European continent, particularly Belgium, for the finest basket-work, and its osiers being generally peeled and the bark containing a large proportion of salicin, manufacturers depend largely upon Belgian willow bark ("rood scorce") as a source of salicin, and in consequence have taken steps to set up chemical works in Belgium for its production, so as to be in close touch with the source of supply of crude material in fresh and unaltered condition.—Trans. Brit. Pharm. Conf., 1903, 474-479.

ROSACEÆ.

Cratægus Oxyacantha, Gärtner—*Medicinal Value*.—George M. Beringer directs attention to the medicinal value of hawthorn berries, the fruits of *Cratægus oxyacantha*, Gärtner (*Mespilus cratægus*, L.), also known as "white thorn," which are said to possess a decided action as a cardiac tonic, and which seem to merit further medical attention. In view of this, he suggests a formula for preparing a fluid extract, which will be found under its proper heading in the section of "Pharmacy" in this report.—Amer. Journ. Pharm., 76, No. 6 (June, 1904), 283-284.

Geum Urbanum—*Formation of Essential Oil by Fermentation*.—E. Bourquelot and H. Herissey report that *Geum urbanum* develops an essential oil which contains eugenol, although that oil does not exist as such in the

plant, but is formed by the action of a ferment. The fresh plant, when bruised and macerated with water for twelve hours, yields a small quantity of essential oil containing eugenol. The alcoholic extract obtained by boiling the root with alcohol 95 per cent. is odorless, and gives solution free from odor with water, but this solution, fermented with yeast, gives distinct indications of the presence of eugenol derived from the splitting-up of a glucoside.—Pharm. Journ., Jan. 9, 1904, 29; from Journ. Pharm. Chim, [6], 18, 369.

Wild Cherries—Occurrence of Salicylic Acid in the Juice.—Jablin-Gonnet states that the juice of the wild cherry, the "merise" of Brittany and Normandy, where it is largely used to color syrups of other fruits, contains salicylic acid as a natural constituent. It is present to the extent of 20 to 30 milligrams per liter as salicylic hydride, which is readily oxidized to salicylic acid.—Pharm. Journ., Feb. 20, 1904, 216; from Annales de Chim. Analyt., 8, 371.

Spurious Wild Cherry Bark—Occurrences in the London Market.—Horace Finnemore calls attention to a spurious wild cherry bark delivered to the Pharmaceutical Department of Guy's Hospital, London, in the ordinary course of business. It was in No. 20 powder, and characterized by not developing the odor of benzaldehyde when moistened with water. The author gives an illustrated description of the microscopical character of this bark, from which it appears that this spurious bark may be distinguished from the genuine bark (from *Prunus serotina*) by the abundance of sclerenchymatous fibres which are observed under the microscope when the powder is covered with a solution of phloroglutin, and then with hydrochloric acid. The spurious bark most nearly resembled *Prunus ovium*.—Pharm. Journ., March 13, 1904, 360.

Quillaia—Toxic Properties.—In a lecture delivered on "The Pharmacology of the Saponins," Dr. R. B. Wild demonstrated the fact that quillaia bark possesses extremely powerful toxic effects on the heart. So readily is the effect produced by the weakest solutions of this drug on the excised heart of the frog that a quantity as minute as one part of sapotoxin in 100,000 of water can be detected by the physiological test. Dr. Wild rather startled his audience by informing it that some dispensers are in the habit of using tincture of quillaia in place of mucilage in bismuth mixtures, and that in consequence the prescriber sometimes finds the mixture produces gastric irritation instead of allaying it. It was also stated that quillaia is employed in emulsifying oils, such as cod-liver oil. Dr. Berdoe calls attention to this so that pharmacists may be made aware of the potency of this drug on the heart muscle, and that if it be the fact that both in medicines for internal exhibition and in articles of food, this dangerous drug finds a place, those who are responsible for its use may be made aware of the risk they run.—Chem. and Drugg., Nov. 28, 1903, 904.

LEGUMINOSÆ.

Copaiba—Tests of Quality.—Caesar and Loretz call attention to the necessity of establishing the solubility of genuine copaiba in petroleum ether within more definite limits than is now required by the Germ. Pharm., and express the opinion that this solubility should be 1 + 1. Turbidity and separation results if indefinite proportions are used. An accurate determination of the solubility in amyl alcohol is also necessary. The best results are still obtained, beside the specific gravity determination, by Rosetti's ammonia test; copaibas that respond to this test in all respects can safely be accepted as belonging to the better and purer commercial sorts.—Pharm. Ztg., 48, No. 74 (Sept. 16, 1903), 754.

Copaiba—Standard Adopted by the Italian Pharmacopœia.—The new Pharm. Ital. gives the sp. gr. of copaiba as between 0.980 and 0.990, thus excluding such light varieties as Para balsam; the yield of essential oil is between 40 per cent. and 60 per cent., the acid-number from 75.8 to 84.2, and the ester-number is included in the total saponification-number, which is from 84.2 to 92.7.—Chem. & Drugg., Sept. 26, 1903, 550.

Balsams—Correction of Certain Solubility Tests of the Pharm. Germ. IV.—Dr. G. Weigel calls attention to inaccurate statements in the Pharm. Germ. IV concerning the solubilities of copaiba and storax in petroleum-ether, and of balsam of tolu in bisulphide of carbon, and on the basis of experiments, which are given in some detail, recommends the following corrections for a future revision:

Copaiba forms a clear solution with 1 or 2 parts, by volume, of petroleum benzin, which becomes turbid on the further addition of the solvent, usually with formation of a flocculent deposit

Storax, in its crude condition, is soluble to the extent of one-third of its weight in petroleum benzin, while the product, purified by solution in alcohol, is soluble to the amount of two-thirds of its weight.

Balsam of Tolu, which is stated to be insoluble in bisulphide of carbon, is in reality soluble to the amount of about one-third of its weight in that liquid.—Pharm. Centralh., 45, No. 1 (Jan. 7, 1904), 1-5.

Balsam of Peru—Solubility Test of the Germ. Pharm.—Weigel has already shown that the statement in the Germ. Pharm. that the balsam of Peru "produces with alcohol a clear mixture" is misleading, and Cæsar and Loretz, calling attention to this, state that the conditions of its solubility are the following: The balsam dissolves clear in an equal part of alcohol, but on the further addition of alcohol gradually becomes turbid until, when six parts of alcohol have been added, the turbidity increases to absolute opacity, which is soon followed by sedimentation of a solid body. A balsam of Peru that is miscible clear with alcohol in all proportions is non-existent.—Pharm. Ztg., 48, No. 74 (Sept. 16, 1903), 754:

Balsam of Peru—Incompatibility with Boric Acid in Salves.—Having

occasion to prepare a salve composed of boric acid, 8.0; balsam of Peru, 10.0; vaseline (yellow), enough to make 50.0, Dr. Isleib found it impossible to obtain a homogeneous mixture of the ingredients, it being indifferent whether the manipulation consisted in first mixing the boric acid with part or the whole of the vaseline, and the balsam was then added, or whether the boric acid was added to a previously prepared mixture of the vaseline and balsam, or, again, whether these mixtures were effected by the aid of heat. The boric acid and balsam appear to form a mass of plastic consistence, which becomes quite unmanageable, separating from the vaseline on trituration and adhering to the sides of the mortar.—Apoth. Ztg., 18, No. 80 (Oct. 7, 1903), 706.

Confirming the above observation of Dr. Isleib, in so far as the incompatibility of the above mixture is concerned, a correspondent of the "Apotheker Zeitung" expresses the opinion, however, that the incompatibility is not due to the boric acid, but that

Balsam of Peru is Incompatible with Vaseline and paraffin salves in general. Thus he has observed that a perfectly satisfactory mixture of the balsam with ointment of ammoniated mercury was obtained, when the latter was prepared with lard; but since this mercurial ointment is required to be made with a paraffin base, the balsam will not mix with it, and separates out in little drops on trituration.—*Ibid.* (Oct. 10, 1903), 712.

Bischoff, referring to Dr. Isleib's observation, is also of the opinion, based upon experience with a mixture of iodoform salve made with a paraffin base and of balsam of Peru, that the incompatibility is not due to boric acid, but to the vaseline. He finds, however, that a homogeneous and satisfactory ointment may be obtained, either with boric acid or iodoform, if these are first triturated with a little castor oil and then with the vaseline. The balsam may then be added, and a faultless, homogeneous ointment obtained.—*Ibid.* (Oct. 10, 1903), 712-713.

Balsam of Peru—Apparent Incompatibility with Vaseline.—J. Minder finds that when balsam of Peru is triturated with 60 to 70 per cent. of yellow vaseline, the mixture, although at first smooth, soon becomes granular. The same is true if boric acid is added to the mixture, the granulation being here still more decided. If lanolin or lard are used instead of vaseline the granulation is not produced.—Pharm. Ztg., 49, No. 17 (Feb. 27, 1904), 177.

Mimosa Flowers—Use of Coloring Matter as Indicator.—L. Robin states that a decoction of mimosa flowers, obtained by boiling 10 Gm. in 200 Cc. of water, cooling, adding 50 Cc. of alcohol, 95 per cent., and filtering into a brown glass bottle, affords a very sensitive indicator for alkalimetry. A little of the solution when largely diluted gives an immediate golden-yellow color with one drop of $\frac{N}{10}$ alkali; the color is at once discharged by the slightest excess of acid. It behaves like phenolphthalein towards carbonates, but may be used in the presence of am-

monia.—Pharm. Journ., May 28, 1904, 744; from Annales de Chim. Analyt., 9, 130.

Acacia—Incompatibility Due to Oxydase.—E. Bourquelot points out that the fact that gum acacia contains an active oxidizing ferment renders it unsuitable for use in many pharmaceutical preparations, and that, in spite of its wide use as an excipient, it is possible that certain active ingredients may become profoundly altered in its presence. Nor is gum acacia the only gum which contains this ferment; myrrh, frankincense, and bdellium also contain an oxydase. Although Goettling called attention to the fact, as long ago as 1809, that mucilage of acacia caused the development of a blue color with guaiacum mixture, the true explanation was not then known, and the importance of the bearing of subsequent discoveries appears to have been overlooked. Among the substances enumerated as being incompatible with gum acacia are, pyrogallol, morphine, vanillin, ordinary phenol, cresylol, ortho- and meta-xylol, thymol, carvol, α and β -naphthol, pyrocatechol, guaiacol, acetylguaiacol, veratrol, creosol, eugenol, acetyleneugenol, methylaniline, ethylaniline, paratoluidine, crude aniline, xylydine, α -naphthylamine, veratryamine, pyramidon, apomorphine, eserine, adrenaline, isobarbaloin, caffeotannic acid, gallic acid and tannin. It will be seen that this list comprises several bodies of constant use in medicine. Paraxyleneol, hydroquinine, resorcin, anisol, and phenethol do not appear to be affected. Nor is the action confined to chemical substances; gum acacia is incompatible with the following galenicals—all bodies containing phenols, such as coal-tar preparations, creosote, lysol, and creolin compounds; all the opium and Calabar bean products; suprarenal extract, all aloetic preparations, and all substances flavored with vanillin; tannin-containing extracts such as those of rhatany, catechu, and rhubarb; fluid extract of *Viburnum prunifolium*, and kola preparations. Obviously, in cases where mucilage of acacia is concerned, this oxidizing action may be eliminated by heating the liquid to 100° C., and thus destroying the ferment. The importance of the subject from a medico-pharmaceutical point of view is considerable, since in many cases the process of oxidation must profoundly modify the therapeutic action of the drug.—Pharm. Journ., June 18, 1904, 825; from Journ. Pharm. Chim. [6], 19, 473, 524.

Gums—Differentiation of Commercial Sorts.—Edward Hirschsohn contributes a voluminous paper, in which he describes an original method for the examination and recognition of commercial sorts of gum and gives the results obtained with a large number. This paper cannot be profitably condensed, and must therefore be consulted in the original, in Pharm. Centralh., 45, Nos. 20–25 (May 19 and 26, and June 2, 9, 16 and 23, 1904), 371, 389, 409, 433, 451 and 469.

Malabar Kino—Properties and Constituents.—Referring to a recent paper on Malabar kino by Edmund White (see Proceedings, 1903, 798),

Dr. Fr. Lühn communicates the results of an examination of genuine Malabar kino, obtained from the Indian Section, Imperial Institute, London. It consisted of small, irregular, sharp-edged, friable, black-brown, odorless pieces, having an astringent taste, and appearing ruby-red translucent on the edges. It was almost completely soluble in water, ethyl alcohol, methyl alcohol and hydrous acetone, leaving less than 1 per cent. of residue. Dried at 105° C., it lost 15.90 per cent.; the ash of the air-dry substance amounted to 0.9 per cent. Anhydrous acetone apparently separates it into two portions, 31 to 32.5 being soluble and 52 to 55 per cent. insoluble in that solvent. The tannin was determined by several methods, with the following results, the percentages being based on the substances dried at 105° C.:

1. Shaking with hida powder (Fres., 28.110), 94.49 per cent.
2. Precipitation with lead subacetate—warmed, 81.28 per cent.
3. Precipitation with lead acetate—cold, 76.17 per cent.
4. Titration with iodo-potassium iodide (F. Jean), 73.82 per cent.
5. Precipitation with cupric acetate (Eder), 39.83 per cent.

The liquors remaining after precipitating the tannin with lead acetate and lead subacetate, yielded, after removal of lead with H_2S , a colorless crystalline substance, readily soluble in water and alcohol, but becoming brown after a time. Its quantity was insufficient for identification. The author was unable to find the "kinoin," obtained and described by Etti in 1878.—Pharm. Ztg., July 25, 1903, 593.

Kino—Difficulties Encountered in Investigating its Constituents.—In a previous investigation (see Proceedings, 1903, 798) Edmund White had shown that "kinoin" did not exist in Malabar kino, and that the constitution of "kino-tannic acid" could not be that of an anhydride of methoxy-pyrocatechin and gallic acid. He now gives an account of further investigation concerning the constitution of kino-tannic acid, but obtained results which seem to show that little success may be expected from an examination of kino as it occurs in commerce at present, owing to the progressive changes which occur in it after issuing from the tree. These changes, which probably take place at first with great rapidity, under the influence of the oxydase (now known to be present in kinos, Rep.), result in the formation of dark-red oxidation products, which finally terminate in the production of phlotaphenes insoluble in alcohol, devoid of astringency, and constituting the gelatinous mass which forms in tincture of kino. An anticipated supply of liquid kino which has been heated to 100° C. immediately after issuing from the incisions in the tree, and in which, therefore, the activity of the oxydase has been destroyed, may enable a more satisfactory investigation into the nature of the constituents of kino, and particularly as to the composition of the kino-tannic acid.—Pharm. Journ., Nov. 14, 1903, 702.

Kino—Improved Method of Collection.—In a previous paper (May,

1903) Edmund White had given an account of an investigation into the cause of the gelatinization of tincture of kino, from which it appeared that this phenomenon was due to the presence in the kino of an enzyme belonging to the oxydases, and this enzyme was subsequently isolated by David Hooper from the fresh juice of *Myristica gibbosa* (see Proceedings, 1903, 733), yielding an unofficial variety of kino. It is believed by Mr. White that this enzyme may be eliminated from the official as well as other kinos by a judicious method of collection, and considers it probable that the following one, adopted by J. G. F. Marshall and described in the "Agricultural Ledger" (1900, No. 11, 381), will accomplish this: "A longitudinal cut is made with an axe or knife, called *macha katti*, through the bark of the trees, down to the cambium, about $1\frac{1}{2}$ ft. long, and side cuts are made to lead into this. A bamboo tube is then fixed at the bottom of the main incision in order to catch the juice. In the course of about twenty-four hours the flow of gum ceases and the bamboo is taken down. When several of these bamboo cups are nearly full they are taken to headquarters and emptied into a large cauldron and the juice boiled. During the boiling, the impurities, consisting of pieces of bark, wood and leaves, rise to the surface and are skimmed off. When sufficiently concentrated to the consistence of a thick extract it is exposed to the sun, in thin layers, in shallow vessels until it is dry enough to crumble to pieces. The kino is then weighed and packed away in wooden cases." This quotation is made in full, as the original paper is not readily accessible to every one.—Pharm. Journ., Nov. 14, 1903, 702.

Entada Scandens, Benth.—*Saponins in the Seeds*.—L. Rosenthaler observes that the seeds of *Entada scandens*, Benth., a tree widely distributed in the tropics, find numerous economic uses, among others, for washing the hair and finer fabrics. This has led him to the presumption that the seeds contain saponin-like bodies, and his chemical investigation reveals the presence of two bodies, which he designates respectively as entada-saponin *a* and *b*.

Entada-Saponin a is separated from the other by fractional precipitation with barium hydroxide, but has not been obtained pure.

Entada-Saponin b is a white hygroscopic powder, and has the composition $C_{15}H_{22}O_{10}$. It is very soluble in water, less soluble in alcohol, and browned when heated to 110° C. When hydrolyzed with dil. HCl, it yields galactose, sapogenin ($C_{30}H_{50}O_6$), and a third substance, which is amorphous and gum-like.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 614-616.

Galega Officinalis, Linne.—*Medicinal Value*.—George M. Beringer directs attention to "Goats' Rue," *Galega officinalis*, L., a perennial herbaceous plant indigenous to southern Europe, which has been demonstrated by Gillett-Damitte (1873) to possess, as had been the popular

belief, valuable galactagogue properties, and this has since been confirmed by other investigators. The tops, including stems and leaves, are the parts used for stimulating lacteal secretions, while diaphoretic, diuretic, antispasmodic and anthelmintic properties are ascribed to the roots. Hitherto it has been recommended in form of infusion of the herb (1 : 20) or in form of an aqueous extract, but the author considers the *fluid extract*, prepared with dilute alcohol, and a *syrup*, prepared from the fluid extract and flavored with oil of fennel, more acceptable, modern and elegant preparation, and recommends formulas for these, which will be found under "Pharmacy."—*Amer. Journ. Pharm.*, 76, No. 6 (June, 1904), 282-283.

Indigo—Cultivation and Preparation in Manchuria.—According to A. Hosie, of the British Consular Service, Indigo is obtained in Manchuria, not from *Indigofera tinctoria*, but from *Polygonum tinctorium*, L., and is called "Lantien." The seeds are sown in April in drills, about 9 inches to 1 foot apart, in the latter half of September. The plants are cut down near the roots in September before blossoming, steeped tops-downwards in lime-lined vats containing water, and weighted with stones. After thirty-six hours the plants are removed, and the water, now green in color, is poured into large earthenware jars standing on a concrete floor having a conduit leading to a large tank sunk in the ground. In a similar jar, containing also green water from the vat, a piece of lime is placed, and the mixture stirred up to the consistency of cream. A portion of this cream, weighing about three pounds, carefully freed from undissolved lime and impurities, is poured into each of the jars. The contents of these jars are then beaten with a square piece of wood, to which a long wooden handle is fixed, until the green water assumes a blue color, and when about five hundred blows have been struck the grain or coloring matter has become completely separated. The jars are then emptied into the conduit, and the blue granules sink in the tank to which they are conveyed. When completely settled down the surface water is removed and the sediment collected and made up into cakes as dry indigo, or poured into waterproof-prepared baskets, and sold as liquid indigo.—*Pharm. Journ.*, April 9, 1904, 497.

Logwood—Increase in Bastard Variety in Jamaica.—It is well known to those who use logwood that it is by no means always of equal quality, the inferior sort being known to dealers as "bastard logwood." In Jamaica trees are found occasionally in which little or no hæmatoxylin is present, but in its place a substance yielding a dull yellowish-green dye. As the amount of this "bastard logwood," which is naturally rejected by dealers, has in recent years increased in Jamaica, Prof. S. F. Earle was asked to investigate the cause. He reports that logwood is a variable plant showing marked differences in form, color and texture of leaf, time of blooming, form and extent of the ribs on the trunk, color of bark, and especially in the color and dye-producing quality of the heart-wood. Four well-marked varieties are said to be recognized in Honduras and three are usually

recognized in Jamaica, but there are many intermediate forms. In the opinion of Prof. Earle the variations in logwood are not the result of disease or of any lack of vigor, nor to immaturity or the influence of soil or climate, but are apparently due to heredity, and the increase probably to the fact that trees chipped into and found to be "bastard trees" are not felled, but allowed to stand and then propagate from seeds. Unfortunately these trees do not possess constant differences in leaf and trunk by which they may be recognized.—Pharm. Journ., July 11, 1903, 43; from Bull. Dept. Agricul. Jamaica, I., 31.

Phaseolus Lunatus.—Presence of a cyanogenetic glucoside in the seeds of the plant collected in Mauritius and absence in a cultivated white variety. See *Phaseolunatin* under "Organic Chemistry."

Psoralea Bituminosa, L.—*Yield and Characters of Volatile Oil*.—Schimmel & Co. have distilled from 20.5 kilos of the dried herb of *Psoralea bituminosa*, obtained from the Riviera, the volatile oil, obtaining 10 Gm. = 0.048 per cent. This plant has a strong asphalt-like odor, especially when it is rubbed, and at one time the leaves were official as "Herba trifolii bituminosi," and were used as a remedy in all sorts of affections. The oil obtained, which was a semi-solid at the ordinary temperature, did not possess the bituminous odor of the crude material in the least degree. The sp. gr. was 0.8988 at 25° C.; acid-number, 57.18; ester-number, 12.25. It was possible to separate from it fatty acids whose melting-points lay between 38° and 40° C. (laurinic acid?).—Schimmel's Rep., Oct.-Nov., 1903, 76.

St. John's Bread—*Constituents of the Unripe Fruit*.—Preliminary experiments upon the unripe fruits of *Ceratonia siliqua*, L., known as St. John's bread, have determined the presence of a crystalline phenolic body, readily soluble in water, alcohol and ether, more difficultly soluble in chloroform. Its aqueous solution has a faintly acid reaction, is colored blue by ferric chloride, and brown when heated with sodium hydroxide. It yields a white precipitate with lead acetate, which assumes a reddish color on addition of sodium hydroxide and dissolves in excess of this reagent. The liquid from which the phenolic body has been separated yields to chloroform when rendered alkaline, a body having some of the alkaloidal reactions. This will be further investigated.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 616.

Tonka Beans—*Presence of a New Copal and Kino*.—E. Heckel, H. J. de Cordemoy and F. Schlagenhaufen have examined the fruits of the Tonka bean, *Dipteryx odorata*, from French Guiana. In transit these were much broken up, so that the bottom of the tin containing them was covered with a granular resinous substance of a yellowish or greenish-brown color. The whole mesocarp of the fruits was filled with the same substance. An examination of the fruit showed that the stony endocarp

contained two concentric series of receptacles filled with the same secretion. In the stem, leaves and calyx other secreting cavities were found filled with a different secretion, of the nature of a red tannin glucoside. The resin was extracted from the crushed pericarps of the fruits by boiling with water and skimming off the melted substance which rose to the surface. This was then dried and extracted with ether. The ethereal solution was pale straw-yellow in color, and left on evaporation a resinous residue which melted on the water-bath. The yield was 5.432 per cent. Similar results were obtained by extracting the raspings of the pericarp with ether. With alcohol the extraction is less rapid, and the resin obtained is of a brownish color.—Pharm. Journ., April 23, 1904, 558; from Répertoire, 60, 97.

The above-named authors have also examined the kino obtained by incision into the trunk of the Tonka bean tree, which occurs as a brownish-red, transparent, moderately soft mass, furnishing a ruby-red powder. It is strongly astringent, but is not entirely soluble in cold water, giving a solution with a voluminous flocculence, which only disappears on prolonged boiling. It is very slowly soluble in alcohol, 90 per cent., at ordinary temperatures, but is more readily dissolved on warming. The aqueous solution is not affected by a drop of ferrous sulphate solution, but on adding a trace of ammonia to the mixture an intense violet color is produced. With the same reagent in concentrated solution the liquid becomes blue, and turns violet-blue on boiling. Both aqueous and alkaline solutions are blackened by contact with iron. With reduced iron it gives a violet color, both with hot and cold solutions, which is discharged by acids and reproduced by alkalies. It reduces ferric salts to the ferrous state. With boiling copper sulphate reduction also takes place, but the precipitate is not wholly copper suboxide, being partially soluble in water. It reduces mercuric chloride when boiled, but does not apparently reduce stannous chloride or bismuth subnitrate. In general reaction it agrees with other kinos.—Ibid., May 28, 1904, 744; from Répertoire [3], 16, 151.

TEREBINTHACEÆ.

Caricari Elemi—*Constituents*.—A. Tschirch and L. Reutter have determined the constituents in a resin designated in the Brazilian Exhibiton (Berlin, 1886), as “Caricari.” This product was enveloped in pisang leaves, and presented a yellow-greenish mass, hardened externally, soft in the interior, and having a pleasant odor of elemi and lemons. It is completely dissolved by ether, sulphide of carbon, chloroform and toluol; nearly completely soluble in acetic ether, benzol, acetone and chloral hydrate (80 per cent.): partially soluble in petroleum ether, methyl- and ethyl-alcohol. Its composition is as follows:

Isocarieleminic Acid, $C_{28}H_{36}O_4$, soluble in ammonium carbonate, 5.

Carieleminic Acid, $C_{28}H_{36}O_4$, soluble in soda, 12.

Cariелеmic Acid, $C_{27}H_{36}O_4$, soluble in soda, 20.

Amyrin, $C_{30}H_{50}O$, 3.

Carieleresen, $C_{24}H_{40}O_2$, 40.

Volatile Oil, 3.

Bitter Substance, Impurities and Loss, 17.

—Arch. d. Pharm., 242, No. 2 (March 5, 1904), 117–121.

Colophonia-Elemi—Composition.—Prof. A. Tschirch and Dr. O. Saal report the results of the examination of a sample of colophonia-elemi from *Colophonia mauritiana*, supplied by E. M. Holmes from the Hanbury collection in the museum of the Pharmaceutical Society. This resin, which originally came from the Island of Mauritius, was of a yellowish-white color, hard consistence, and had an odor, which, like that of the other elemi resins (see Proceedings, 1903, 799 and 800), is similar to the oils of fennel, dill, and lemon. The substance contained minute crystals, revealed only by the aid of the microscope. The resin was soluble in chloroform, ether, acetic ether, acetone, toluol, and hot alcohol; partly soluble in petroleum-ether, methyl alcohol, carbon disulphide, and carbon tetrachloride; insoluble in water; acid-number, 35.0 to 36.4; saponification-number, cold = 61.6, hot = 64.4. Its composition was as follows: α -isocolelemic acid, 10 per cent.; colelemic acid, 2 per cent.; β -isocolelemic acid, 8 per cent.; colamyrin, 25–30 per cent.; coleleresen, 30–35 per cent.; volatile oil, 3 per cent.; and a small quantity of bryoidin and of a bitter substance, the remainder (10 per cent.) consisting of bark and other impurities.—Pharm. Journ., April 2, 1904, 467.

Mastic—Constituents.—Basing their results upon an examination of a superior commercial mastic obtained from Chios, A. Tschirch and L. Reutter report the following constituents of the oleo-resin:

I. Free resin acids:

a. Soluble in 1 per cent. ammonium carbonate:

α -Masticinic acid, $C_{23}H_{36}O_4$, precipitable by lead.

β -Masticinic acid, $C_{23}H_{36}O_4$, not precipitated by lead.

Together, 4.0.

b. Soluble in 1 per cent. soda solution (insoluble in ammonium carbonate):

Masticolic Acid, $C_{23}H_{36}O_4$, 0.5.

α -Masticonic Acid, $C_{27}H_{44}O_4$, 20.

Both precipitable by lead; and

β -Masticonic Acid, $C_{27}H_{44}O_4$, 18.0.

Not precipitable by lead.

II. Resins:

α -Mastico-resin, $C_{36}H_{56}O_4$, soluble in alcohol, 30.0.

β -Mastico-resin (masticin), insoluble in alcohol, 20.0.

III. Volatile oil, 2.0.

IV. Bitter principles, impurities, etc., 5.5.

Mastic is a resen-resin. Johnson's *A-Resin* or *Mastic-acid* contains the five acids above-mentioned resins and *a-mastico-resin*; his *B-Resin* or *Masticin* is impure B-Mastico resen. The sample of mastic examined exhibited the following solubilities: Insoluble in water; partly soluble in oil of turpentine, carbon bisulphide, methyl- and ethyl-alcohol (to $\frac{3}{4}$); nearly completely soluble in petroleum ether, acetone, amyl-alcohol; completely dissolved by acetic ether, chloroform, ethyl-ether, xylol, benzol, toluol and 80 per cent. chloral hydrate.—Arch. d. Pharm., 242, No. 2 (March 5, 1904) 104-110.

Myrrh—Sensitive Reagent.—In the course of his researches on the chemistry of the more important resins, gum-resins and balsams, published in 1877 and 1878 (see Proceedings,), Ed. Hirschsohn had employed with advantage a chloral reagent, obtained by passing dry chlorine into absolute alcohol and consisting essentially of "impure chloral hydrate," for distinguishing genuine myrrh from other gum-resins. This gave with the ordinary (Herabol) myrrh a magnificent violet coloration, whereas Indian (Bissabol) myrrh and bdellium gave no such color. He has now produced a reagent on these lines which he finds far more sensitive, which is obtained by warming 1 part by weight of *trichlor. acetal* and 4 parts by weight of chloral hydrate, thus producing a syrupy liquid, which fumes slightly when exposed to the air. The smallest quantity of Herabol myrrh produces the magnificent violet color mentioned with this reagent, while no other resin or gum-resin known to the author produces this reaction. The reagent is quite stable, a preparation made three years ago being still perfectly reliable. The trichlor. acetal required for this reagent is best obtained by the method of Byasson, which is carried out, passing chlorine gas into 75 per cent. alcohol, if possible, under exposure to sunlight, until the liquid becomes turbid and separates into two layers. The lower layer is shaken with an equal volume of water, then, to remove acidity, with calcined magnesia, and filtered. While neutral when fresh, it soon acquires acidity and the property of fuming on exposure to air.—Pharm. Centralh., 44, No. 47 (Nov. 19, 1903), 809.

Rhus Glabra—Chemical Study of the Seeds.—G. B. Frankforter and A. W. Martin have subjected the seeds of *Rhus glabra* to chemical investigation, which revealed some interesting particulars concerning the relation of the husk and the seed proper to each other and their constituents. Heretofore only the briefest preliminary examination appears to have been made. Tannin has been recognized in the seed and malic acid in the pubescence, while in addition to these constituents, fixed oil, a volatile oil and coloring matter have been mentioned. Selecting the fully-matured seed, gathered about September 1st, when the husk had begun to dry, the moisture was determined to amount to 6.862 per cent; the ash, 2.62 per cent.; the acids, from 5 Gm. of unhusked seed, extracted by hot water, were of a complex nature, saturated 0.059 Gm. of NaOH; ether

extracted 22.36 per cent.; alcohol, 6.74 per cent.; and water, 4.76 per cent. The separation of the husk from the seed proper was effected, without crushing the latter in the slightest degree, by passing the whole seed through a carefully adjusted pulp mill. The seed proper amounted to 60.1 per cent., the husk to 39.9 per cent. It was found that the latter was responsible for the greater part of the ash, much of which was probably due to the collection of dust on the pubescence. The acidity, as expected, also largely preponderated in the husk, the extract from the seed proper requiring only one-fourth of the amount of NaOH necessary to neutralize the same weight of the unhusked seed. Furthermore, the seed proper contained only 4.93 per cent. of moisture, 1.98 per cent. of ash, and yielded to ether 9.1 per cent. of a light yellow mobile oil, apparently a single substance, having a peculiar odor, pleasant taste, sp. gr. at 20° C. of 0.9203, becoming viscous at -18° C., and solid at -24° C. It is optically inactive, has the saponification value of 190 to 200, an iodine value of 86 to 88, and is non-drying and soluble in nearly all the organic solvents. The oil from the husk, on the other hand, is evidently a complex body. It is black, semi-solid at the ordinary temperature, and in this condition, at 20° C., it has the sp. gr. 0.9412. It was obtained by extraction with ether to the amount of 8.5 per cent. Like the seed oil, the husk oil is non-drying; the chief differences between the two oils, besides those mentioned, being due to unsaponifiable matter, to an easily oxidizable body, and to the fact that husk oil contains two distinct oils, separable by acetone into 80 per cent. of a yellow oil, differing, however, from the seed oil, and into a black, unsaponifiable, semi-solid oil. The husks also contained 7.32 per cent. of tannin and 1.35 per cent. of calcium malate.—*Amer. Journ. Pharm.*, 76, No. 4 (April, 1904), 151-158.

Remedy for Poison-Oak Poisoning—Formula.—Julian L. Waller recommends the following remedies for poisoning by poison-oak:

I. FOR EXTERNAL USE.

Sodium hyposulphite	1 oz.
Menthol	5 grn.
Alcohol	1 dr.
Distilled water	1 pint.

Dissolve the soda salt in the water and the menthol in the alcohol, and mix the two solutions and filter. Directions: Apply freely to affected parts with soft sponge to cure; and apply night and morning as a preventive.

2. FOR INTERNAL USE.

Magnesium sulphate	1 oz.
Fowler's solution	1 fl. oz.
Syrup	2 fl. oz.
Distilled water, to make	8 fl. oz.

Dose: Tablespoonful every six hours.—*Merck's Rep.*, Aug., 1903, 218.

PIPERACEÆ.

Peppers—Proximate Examination of Commercial Sorts.—James W. Gladhill has examined 13 different kinds of peppers, all type samples, 9 of which were black peppers and 4 white peppers, and all in two or more samples, as exhibited in the table recording the results of the proximate examination. This consisted in the determination of ash, of ether-extract, of piperin, and of oleo-resin, in each sample by methods described, while the physical character of the type samples are described in detail and in the order of their superiority—this order being indicated in the table, beginning for black peppers with “Singapore,” and ending with “Acheen C.,” and for white peppers with “Coriander,” and ending with “Decorticated.” The examination also included 8 lots of “hulls”—that portion of the grain known as the sarcocarp, which is removed in making white pepper. This product varies in color from light brown to dark brown, and has a pungent odor and taste. In the case of each type the author gives the average results for all the samples of the type, which might have been more profitably included in the table following:

Black Pepper.	Ash.				Ether Extract.				Piperin.				Oleo-resin.			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Singapore.....	3.5	3.7	4.2	4.5	9.76	8.76	9.52	9.60	7.13	7.68	6.58	7.33	2.63	1.08	2.94	2.27
Tellicherry	4.7	4.8	3.8	4.5	8.34	8.85	7.26	7.62	5.91	6.02	6.56	6.82	2.43	2.83	.70	.80
Aleppy	4.7	4.7			9.65	9.47			7.70	6.75			1.95	2.72		
Trang	3.9	3.8			8.44	8.83			5.12	5.61			3.32	3.22		
Lienburg	3.8	4.0	3.6	4.0	8.70	9.48	8.83	8.78	6.50	6.28	5.98	6.31	2.20	3.20	2.85	2.47
Lampung	5.0	5.5	5.4	5.2	8.92	10.31	8.76	9.58	7.76	8.30	7.00	7.28	1.16	2.01	1.76	2.30
W. C. Sumatra.....	4.3	4.0			9.28	9.22			7.00	6.68			2.28	2.54		
Acheen A.	4.3	4.5	4.	4.7	10.06	10.10	9.80	9.20	7.56	7.96	7.67	7.10	2.50	2.14	2.13	2.10
" C.	5.5	5.2			10.46	10.46			10.02	9.94			.44	.52		
White Pepper.	Ash.				Ether Extract.				Piperin.				Oleo-resin.			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Coriander.....	1.0	.8	1.	.8	8.27	11.68	8.16	7.90	6.81	9.00	7.16	6.84	1.46	2.68	1.08	1.06
Singapore.....	1.1	1.	1.2		8.78	8.45	8.20		7.26	6.78	7.20		1.52	1.67	1.00	
Penang.	2.1	2.8	2.6		7.04	7.20	6.80		5.74	6.76	5.83		1.30	.44	.97	
Decorticated	1.9	.8	1.2		7.64	6.60	7.26		6.25	6.30	7.02		1.39	.30	.24	
Hull	Ash.				Ether Extract.				Piperin.				Oleo-resin.			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Hull	9.4	9.6	8.9	7.0	7.7	8.3	8.3	8.8	6.39	6.39	8.88	8.93	5.36	5.46	5.00	5.92

The conclusions arrived at from these examinations are formulated by the author as follows: The ash should not be above 6.5 per cent. for black pepper, and 3 per cent. for white pepper. None of the samples examined gave so high a percentage of ash; 1 per cent. is allowed for sand and other material which has gotten in in the packing of the pepper; the highest ash was 5.5 per cent. for black pepper, and 2.8 per cent. for white pepper, which was a very dirty sample.

The ether extract should be between 7.5 and 10 per cent. for black pepper, and 6 and 9 per cent. for white pepper. In only one case did the ether extract exceed 9 per cent., and that was in coriander pepper, which sometimes runs as high as 11 per cent., but this variety is never ground for white pepper, but is sold in bulk whole, the cost being too great to permit being ground for commercial white pepper.

Piperin should be present in from 5.5 to 9 per cent. in a good black pepper. Any samples that do not show this percentage are not to be considered good peppers, and while they may be used to blend the flavor they should not be used in such quantity that the percentage of piperin would fall below 5.5 per cent.

Regarding adulterants used in black and white peppers, the author observes that besides the hull he has examined only one, namely,

Cocoanut Shells, the result being as follows: Ash, 8 per cent.; ether extract, 0.42 per cent. If this is added to the pepper, the ash will be high and the percentages of ether extract, piperin, and oleo-resin, will be low. Adulteration with the hull may be recognized by the increase in the ash-percentage and in the oleo-resin, and the decrease in the piperin, for the hulls contain no piperin at all and never less than 7 per cent. of ash—though there are hulls on the market which contain broken pepper and will contain from 1 to 2 per cent. of piperin.—*Amer. Jour. Pharm.*, 76, No. 2 (Febr., 1904), 71-81.

Kawa Root—Chemical Constituents.—After giving an anatomical description of young and old kawa roots, P. Siedler gives an account of the chemical examination conducted with the assistance of Winzheimer. Leaving out of consideration the two previously known and described crystalline bodies, *methysticin* and *yangonin*, the most important constituent is the *resin*, which is the source of the anæsthetic action of kawa root. The present investigation proves this resin to consist mainly of a mixture of different resin-acid esters, while the smaller fraction is composed of resins (resin-acids) soluble in 1 per cent. solution of ammonium carbonate or 1 per cent. caustic alkali under the conditions of Tschirch's method of fractionating resinous products.—*Pharm. Ztg.*, 48, No. 77 (Sept. 26, 1903), 781.

RHAMNÆ.

Cascara Sagrada—Valuation of Water-Soluble Content.—E. Dowzard

suggests the valuation of cascara sagrada on the basis of water-soluble matters, and proposes its determination as follows: About 50 grams of the sample is dried at about 95°–100° C., and the loss in weight noted; the dry bark is then reduced to fine powder, 1 gram of which is transferred to a 100 Cc. measuring flask, 90 Cc. of distilled water is added, and the flask placed in boiling water for two hours, shaking frequently. The contents of the flask are cooled and made up to 100 Cc., 0.5 Cc. of water is then added (this is about equal to the volume of woody fibre), and the mixture poured on a dry filter-paper; 20 Cc. of the filtrate is evaporated to dryness in a tared aluminum basin, and the residue dried at 100° C. till constant in weight; the result, multiplied by 500, gives the percentage of extract in the dry bark, from which can be calculated the amount present in the undried sample. On the basis of the direct examination of twelve samples of the bark he concludes that good cascara sagrada should yield at least 30 per cent. of water-soluble matters. Age does not appear to have much effect on the water-soluble matters, as will be seen by the results shown in the following table:

	Extractive.	
	Undried Sample.	Dried Sample.
1899 bark.....	29.2 per cent.	31.5 per cent.
1901 bark.....	30.9 per cent.	33.5 per cent.
1903 bark.....	29.6 per cent.	32.0 per cent.

Chem. & Drugg., Dec. 12, 1903, 990.

Jujube Tree—Possible Utilization as a Hedge Plant, etc.—The Superintendent of the Botanical Garden at Washington, D. C., expresses great faith in the ultimate utility of the “jujube,”

Zizyphus jujuba as a hedge plant, its only drawback being an inclination to suckers when the roots are broken by cultivation. According to the “Confectioners’ Gazette” of recent date, the fruits of this and other varieties of *Zizyphus* are highly prized by the Chinese, who prepare from them a pleasant sweet-meat, the “Chinese date.” The reddish-orange, subacid berries, which are produced in three years after planting, ripen in November and December in California, where the tree was introduced about sixteen years ago by G. P. Rixford, and, without special care, have attained a height of ten or twelve feet, and bear regularly a large amount of fruit. The editor of the “National Druggist” mentions that some fifty years ago a small slip of a jujube plant was brought to Mobile, Ala., by a ship captain in the China and India trade, and this, after transplanting

sometime afterwards from the pot into the garden, and being left without care during the period of the Civil War, had invaded the entire end or corner of the large garden in which the slip had been planted. So there can be no question concerning the cultivation of the plant on account of unsuitableness of climate or soil in the Southern States. He furthermore observes that the fruit when fully ripe is sweet, but otherwise almost tasteless; when eaten just before it turns red it has a pleasant acidity and a distinct flavor of its own. The full-grown, but yet green, fruit makes elegant preserves.—Nat. Drugg., April, 1904, 101.

II. ICINÆ.

Ilex Paraguayensis.—*Yield and Characters of Volatile Oil*.—Heinr. Hænsel has obtained from the dried leaves of *Ilex paraguayensis* 0.775 per cent. of a dark-yellow volatile oil, which possesses the odor and taste of Paraguay tea in concentrated form. At the ordinary temperature this oil is nearly solid, and has the following constants: Sp. gr. at 15° C., 0.8875; optical rotation, at 20°, + 3.73°; m. p. at + 26.5° C.; acid-number, 61; saponification-number, 91. The oil has an acid reaction, and while readily soluble in 96 per cent. alcohol, it is difficultly soluble in 80 per cent. (vol.) alcohol.—Pharm. Ztg., 49, No. 32 (April 20, 1904), 335.

EUPHORBIACÆ.

Cassava.—*Starch Content in Different Varieties*.—As is known a large number of varieties of the cassava plant are cultivated in tropical countries, where the tuberous roots yield an important food product. Seventeen varieties have been analyzed for R. Thomson, of Jamaica, and were found to vary in percentage of starch from 19.30 to 36.50 per cent.—Pharm. Journ., Aug. 8, 1903, 237; from Bull. Dep. Agric., Jamaica, I, 35-38.

Castor-oil Seeds.—*Saponifying Action Due to Cytoplasm*.—Nicloux does not consider that proof has been given that the active saponifying action of castor-oil seeds is due to a ferment, as stated recently by Connstein and others. On the contrary, he attributes the action to cytoplasm, which has remarkable lipolytic powers. When this cytoplasm is removed the seeds then become devoid of saponifying action, although all their other constituents are present. Cytoplasm, alone, in suspension in fifty times its weight of cotton-seed oil in the presence of a trace of acetic acid, saponifies 80 per cent. of the oil in about thirty minutes at 20° C. and 500 times its own weight in fifteen hours.—Pharm. Journ., June 25, 1904, 852; from Comp. rend., 138, 1175.

Castor-oil.—*Methods of Administration*.—George W. Hague says the great fault with most druggists is that they know only of one method for administering castor-oil, whereas several methods are necessary to fit the

individuality of cases. He communicates the following different methods, the one or other of which he thinks will meet every demand :

1. Put about $1\frac{1}{2}$ ounces of cinnamon water in a glass ; on this pour 1 ounce of castor-oil ; on the oil put 20 to 30 drops of compound tincture of cardamom, and then hand the mixture over to the customer to be drunk.
2. Mix the oil with two parts of molasses and warm slightly.
3. Draw a glass of sarsaparilla soda, using the fine stream from the fountain, and then pour in the oil. The oil will lie between the soda-water and the foam, and will not come in contact with the glass. Neither will it soil the glass so that it will be difficult to wash.
4. Mix the oil with an equal portion of brandy. This will partly "cut" it, and will so "bite" the tongue that the oil cannot be tasted.
5. Draw a glass of soda as in process No. 3, pouring in the oil as there directed ; then pour the whole into a strong bottle, cork it quickly, and secure the cork by means of strong twine.
6. Make a 50-per cent. emulsion with mucilage of acacia and flavor with oils of cinnamon and peppermint.
7. Place a few grains of sodium bicarbonate and tartaric acid in a glass ; pour in the oil ; pour in an equal amount also of the mixed syrups of raspberry and sarsaparilla ; beat the mixture up until it foams, and then dispense it.
8. Give the castor oil alone in its plain state. By first placing a strong peppermint lozenge in the mouth, and holding it there for a few minutes, the oil can be drunk without discomfort. It can then be followed by another lozenge, kept in the mouth as long as may be desirable.

Mr. Hague finds method No. 1 the best for general use. The dose is readily mixed and cannot be tasted. For children No. 2 is the best. No. 3 is the best in cases when the mere appearance of oil is nauseating to the patient, while Nos. 5 and 7 furnish suitable mixtures to be sent to the home of the patient.—Bull. Pharm., Aug., 1903, 329.

Echinacea Angustifolia—*Medicinal Use of the Root*.—Some years ago Prof. L. E. Sayre called attention to the therapeutic use of the root of a common Kansas weed, *Echinacea angustifolia* (see Proceedings, 1898, 869), giving also a description of the root, and the results of a personal examination. (See also Proceedings, 1903.) Since then the demand for the root has increased to such an extent that there seems to be danger of its extermination, the demand coming, however, from manufacturers of medicinal agents. The precise use to which this drug is put is not revealed in the present paper, and it is therefore difficult to conceive why this particular weed should be the object of protection and cultivation, as suggested by the author.—Drugg. Circ., 48, No. 1 (Jan., 1904), 5.

URTICACEÆ.

Hops—Method of Valuation and Source of Antiseptic Action.—Ernst Hantke finds that the antiseptic action of hops is due to the presence of a soft resin, soluble in petroleum ether. This body possesses a more powerful antiseptic action than salicylic acid, but from its cost it is not available for practicable application. The quantitative determination of this soft resin serves, however, as a factor for determining the quality of hops, which should yield at least 12 per cent. of this body, together with 2.5 per cent. of tannin. The latter may be satisfactorily determined by means of Loewenthal's process. By determining the amount of ether extract in hops, before and after extraction with the wort, in the process of brewing, further indications of quality may be obtained. With good hops, at least 30 per cent. of the ether-soluble constituents is removed by the wort. The amount of water in good hops should be about 10 per cent. If this figure be exceeded, the hops will not keep well: if less than 9 per cent. of water be present, they will fall to pieces in the process of brewing. The author has detected the presence of an alkaloid in hop seeds, concerning which further details are promised.—Pharm. Journ., Feb. 6, 1904, 148; from Zeits. ges. Brauw., 26, 217.

ULMACEÆ.

Cecropia Obtusa—Therapeutic Value.—Gilbert and Carnot have investigated the therapeutic value of the leaves of *Cecropia obtusa*, lately introduced as a new drug from Brazil. They find that the active constituents of the leaves are represented in an alcoholic extract of the leaves, and that this strongly augments the energy of the muscular contraction of the heart, lasting for a long time without the necessity of giving toxic doses. The alcoholic extract is also said to possess pronounced diuretic properties, and the drug therefore appears to be a valuable heart tonic, which may prove particularly useful in asystolic conditions.—Pharm. Ztg., 48, No. 56 (July 15, 1903), 563; from Nouv. Reméd., 1903, No. 12.

CUPULIFERÆ.

Folia Betulæ—Diuretic Value.—Professor Jaenicke recommends birch leaves, in form of tea, as an efficient diuretic, and particularly useful in kidney gravel. The tea is made in proportion of a teaspoonful of the leaves to $\frac{1}{4}$ liter of water, and requires to be taken during about 6 months.—Pharm. Ztg., 49, No. 37 (May 7, 1904), 386.

Birch Tar—Adulteration with Naphtha Residues.—In a previous communication (Pharm. Ztschr. f. Russl., 1893, 42), Ed. Hirschsohn has shown that two principal sorts of birch tar are found on the market, differing in price, which may be distinguished from each other by their specific gravities, and, by experts, also by their color and odor. The more expensive and better sorts show a variation in specific gravity of from 0.926 to

0.940, while the cheaper and inferior sorts vary from 0.953 to 0.987. Both sorts are liable to adulteration with pine tar, but the cheaper kind almost invariably consists of a mixture of true birch tar and pine tar, the presence of the latter being revealed by the pine tar resin acids, which form copper compounds when shaken with acetate of copper solution (1 : 1000) that are easily soluble in petroleum ether ; and also by giving the furfural reaction—a red color when pine-tar water is treated with a few drops of pure aniline, followed by hydrochloric acid—furfural being absent in genuine birch tar. Recently, however, the author has met with cheap birch tars of very low specific gravities (0.910 to 0.920), which failed to give the copper acetate reaction for pine tar resin-acids and the reaction for furfural, but gave evidence of being adulterated. Investigation showed that these birch tars were adulterated with crude naphtha (petroleum) or with the naphtha residue known by the name of “massut.” Mixtures of genuine birch tar with 20 per cent. of either of these showed specific gravities of 0.920 and 0.918, respectively. These adulterated tars are not entirely soluble in acetone, whereas pure birch tar is completely so.—Pharm. Centralh., 44, No. 49 (Dec. 3, 1903), 845.

CONIFERÆ.

Turpentine—Tests for Distinguishing the Natural from the Artificial Products.—Experiments made by Ed. Hirschsohn, with the object of determining a reliable method for distinguishing artificial turpentine from the common, natural turpentine and larch turpentine, which are given in detail, lead him to the conclusion that this becomes possible by the difference in the solvent effect of official ammonia water and 80 per cent. alcohol upon them, under the conditions indicated in the following table :

Kind of Turpentine.	Ammonia Solution (sp. gr. 0.960), 1 p. turpentine and 5 p. ammonia solution.	Alcohol, 80 per cent. <i>Tralles</i> , 1 p. turpentine and 3 p. alcohol.
Venice turpentine	Is not disintegrated; produces a milky fluid in the water-bath.	Yields a nearly clear solution.
Common turpentine	Easily disintegrated, forming a milky mixture, then gelatinous; becomes clear in the water-bath.	Large quantities are deposited, but the mixture becomes clear in the water-bath.
Artificial turpentine.	Is disintegrated, becomes clear in the water-bath for a moment, then turbid.	Turbid solution and precipitation; turbid in the water-bath with precipitation.

A mixture of common turpentine with larch (Venice) turpentine is

recognized by the turbidity of, and separation from, the solution of 1 Gm. of the sample in 3 Gm. of 80 per cent. alcohol (Tralles). The same occurs if the common is replaced by artificial turpentine, but the latter is differentiated by ammonia, from the fact that in the presence of 20 to 30 per cent. of common turpentine the sample is easily disintegrated, and the solution becomes clear in the water bath, while in the presence of artificial turpentine the behavior is the same as with the pure Venice turpentine.—Pharm. Centralh., 44, No. 48 (Nov. 26, 1903), 825–828.

Austrian Turpentine—Chemical Examination.—According to A. Tschirch and George Schmidt, Austrian turpentine is collected in Lower Austria from *Pinus Laricio*, Poiret, in the Piesting and Triesting valleys, the method of the extraction being similar to that practiced in the United States. This turpentine, which has been subjected to comprehensive chemical examination, was a viscous, opaque liquid, of the consistence of honey, strong terebinthinate odor, and bitter, somewhat irritant taste; soluble in ethyl-methyl- and amyl-alcohol, ethyl- and methyl-ether, acetone, chloroform, benzol, toluol, and tetrachloride of carbon; nearly soluble in hot glacial acetic acid, in bisulphide of carbon and petroleum ether; insoluble in water, but communicating a bitter taste to it. It is composed of two resin-acids:

Laricopinic Acid, $C_{21}H_{30}O_3$, which is amorphous and obtained by shaking out with 1 per cent. ammonium carbonate solution; and

Laricopinonic Acid, $C_{20}H_{28}O_4$, which is crystalline, and obtained by shaking out with 1 per cent. sodium carbonate solution.

Both of these acids are soluble in sodium hydrate solution, the first amounting to 25 per cent., the second to 34 per cent. The substances insoluble in sodium hydrate are: Volatile oil, 35 per cent., resin, 2 per cent.; water, bitter principle, and impurities accounting for the remaining 4 per cent. The paper is concluded with a tabulated comparison of the coniferous resin-acids, which are divisible into two groups, the one giving saponification numbers, designated as the "Abietinic Acid Group;" the other, which yields no saponification numbers, designated the "Pimaric Acid Group," in accordance with the resin-acid serving as the type. The interesting tables accompanying this paper give for *pimaric acid* the formula $C_{20}H_{30}O_4$ and for *abietinic acid* the formula $C_{19}H_{28}O_4$; but Tschirch, notwithstanding that innumerable elementary analyses and molecular determinations have been made, is not prepared to vouch for the correctness of these formulas.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 570–588.

American Rosin—Constituents.—A. Tschirch and B. Studer, using as material a sample of American colophonium (rosin) guaranteed as to source, have determined and studied the nature of its constituents and communicate the details and results of these experiments. According to

Mohr, the principal plant yielding the turpentine from which the American rosin is obtained is *Pinus Australis*, Michx.; to some extent also, *P. heterophylla*, Elb.; rarely *P. echinata*, *P. Taeda* and *P. scopida*. The sample under examination (presumably from *P. Australis*) consisted of light yellow pieces, varying in size from that of a nut to a fist, transparent, conchoidal in fracture, and reducible to a pure-white powder. It was completely soluble in the ordinary solvents for resin, including petroleum ether, in which some other varieties of colophonium are only partly soluble. Its alcoholic solution is strongly acid in reaction. Its sp. gr. at 15° C. was 1.090. Its composition was proved to be as follows:

1. Acids soluble in ammonium carbonate:

α -Abietinic acid, $C_{19}H_{28}O_2$, forming an insoluble lead salt, 30 per cent.

β -Abietinic acid, $C_{19}H_{28}O_2$, not forming a lead salt, 22 per cent.

2. Acid soluble in sodium carbonate:

γ -Abietinic acid, $C_{19}H_{28}O_2$, insoluble in ammonium carbonate, 31.06 per cent.

3. Volatile oil, 0.4 to 0.7 per cent.

4. Resen, 5 to 6 per cent.

The impurities amounted only to 0.1 per cent., the loss in operation, however, to 10 per cent. Fahrion having proposed a method for the differentiation of different colophoniums, based upon their relative solubility in petroleum ether, the authors have determined the amount of solvent necessary to dissolve 1 Gm. of colophonium, freshly powdered, and old powder—also extending their investigation on the solubility of the abietinic acids and the resen, with the following results:

	Petroleum ether.
Colophonium, old powder, 1 Gm. required.....	400 Cc.
Colophonium, fresh, 1 Gm. required.....	60 Cc.
α -Abietinic acid, 1 Gm. required.....	500 Cc.
β -Abietinic acid, 1 Gm. required.....	100 Cc.
γ -Abietinic acid, 1 Gm. required.....	100 Cc.
Resen.....	50 Cc.

These results show that all the resin-acids, as well as the colophonium, are more or less soluble in petroleum ether, and that fresh colophonium is more readily soluble than the isolated acids, a peculiarity which has also been noticed in the case of other bodies. On the other hand, old colophonium is much less soluble in petroleum ether than the fresh rosin.—Arch. d. Pharm., 241, No. 7 (Oct. 17, 1903), 495-522.

Canada Balsam—Characters and Distinction from "Oregon Balsam."

—In view of the meagre published works on Canada balsam, E. Dowzard has determined some of the analytical characteristics of this oleo-resin as an aid to its distinction from the so-called "Oregon balsam," which is be-

ing used as its adulterant. The chemical constituents of Canada balsam, as given by K. Dieterich, are: Lævorotatory etherial oil, resin soluble in alcohol, resin sparingly soluble in alcohol, caoutchouc, bitter principles, extractives, traces of acetic acid. Canada balsam gives a turbid solution with five volumes of 90 per cent. alcohol, and does not yield a clear solution even with absolute alcohol. Mr. Dowzard has found the balsam to have the following analytical characterization: Sp. gr. at 15.5° C. 0.987 to 0.994; optical rotation, 100 Mm. + 1° to - 4°; refractive index, 20° C., 1.518 to 1.521; resin, 68 per cent. to 73 per cent.; acid value of the oleo-resin, 84 to 87; acid value of the isolated resin, 120 to 124. The essential oil gave the following figures: Sp. gr. at 15.5° C., 0.862 to 0.865; optical rotation, 100 Mm. - 26° to - 29°; refractive index, 20° C., 1.472 to 1.477; ester, as bornyl acetate, 0.4 per cent. to 0.6 per cent.

Oregon Balsam appears to be made by dissolving colophony in oil of turpentine. A sample examined by the author was soluble in all proportions of 90 per cent. alcohol; this alone is sufficient to distinguish it from Canada balsam, but it is of no use as a test for a mixture of the two oleo-resins; it also possesses a slightly different odor, which, however, cannot be relied on in cases of mixtures wherein Canada balsam predominates. The sp. gr., optical rotation and refractive index were determined, but did not yield results of much value. The sp. gr. of Oregon balsam (0.993) is practically the same as that of Canada balsam, the refractive index (1.5125) is slightly lower, and the optical rotation (-3° 12') is lævorotatory, not dextrorotatory as in the Canada oleo-resin. In the volatile oil distilled from Oregon balsam there is also little difference shown. The sp. gr. (0.8652) is practically the same; the refractive index (1.4670) is lower, and the ester content (0.8 per cent.) higher, than that of Canada balsam; but a greater difference is shown in the optical rotation of the two balsams, which in Oregon balsam is -37° 24'. The resin percentage of the two balsams is practically the same, but the acid value (153) of the resin from Oregon balsam is much higher, being practically the same as the average acid value of colophony, which is about 155; and this proves to be the most valuable test for the purity of Canada balsam, which is best carried out as follows: First estimate the amount of resin present by driving the oil off from a weighed portion (1 to 2 grams) of the sample. Then dissolve 3 grams of the balsam in neutralized alcohol and titrate with $\frac{N}{2}$ KHO, using phenolphthalein as an indicator. The acid value of the resin is then easily calculated.—Chem. and Drugg., Mar. 12, 1904, 439.

B. ANIMAL DRUGS.

Sponges—Bleaching and Cleaning for Surgeons' Use.—The "Bayerische Gewerbeblatt" gives the following directions for disinfecting and bleaching sponges for the use of surgeons: A sponge that has been used in surgical

operations or for other purposes should first be washed in warm water, to every liter of which 20 drops of liquor of soda have been added; afterwards washed in pure water, wrung or pressed out and put into a jar of bromine water, where it is left until bleached. Bleaching is accelerated by exposing the vessel containing the bromine water to the direct rays of the sun. When the sponge is bleached it is removed from the bromine water and put for a few minutes in the water containing soda lye. Finally it is rinsed in running water until the odor of bromine disappears. It should be dried as rapidly as possible by hanging it in the direct sunlight.—Nat. Drugg., Nov., 1903, 321.

Galechia Nanella—*A New Insect Pest to Fruit Trees*.—An excellent account of the life-history of a new insect which attacks the leaves and buds of the peach, apricot, plum and cherry trees is given in the "Gard. Chron.," 34, 185. The insect, which belongs to the group of moths named Tineina, is called *Galechia nanella*. It forms linear white mines in the tissue of the leaves during August and September, and when the fall of the leaf approaches, the larva, about $\frac{1}{8}$ inch long, forms little white silken cases in the axils of the leaf-buds, or in wall-ties, in the folds of the cloth shreds or crevices of the wall, and at the end of February proceed to attack the flower-buds, and are full grown at the end of May, when the chrysalis may be found in the buds, the moth emerging early in July. The life-history being known, the proper time to apply remedies is obvious, petroleum emulsion, quassia or other insecticides being applied by the third week in February.—Pharm. Journ., Nov. 7, 1903, 661.

Bees-wax—*Results of Examination of a Large Number of Samples*.—F. J. Smith contributes an interesting paper on bees-wax and its adulterants, in which he tabulates the results of the examination of a large number of samples, as follows:

TABLE OF RESULTS OF THE EXAMINATION OF SPECIMENS OF BEESWAX.

	1	2	3	4	5	6	7	8	9	10	11	12 Chi- nese ?	13	14
S. G. at 15° C.	0.932	0.9525	0.946	0.962	0.964	0.960	0.961	0.945	0.963	0.963	0.950	0.9435	0.9310	0.920
M. P.	59.0	62.0	59.0	65.0	65.0	63.0	63.5	61.0	64.5	64.0	63.0	45.0	71.0	71.0
H ₂ SO ₄ test	large qty. par- affin.	affin or cere- sin.	large qty affin.	no affin.	affin or cere- sin.	no affin.	no affin.	affin or cere- sin.	no affin or ce- resin.	no affin.	affin or cere- sin.	large qty affin.	large qty cere- sin.	large qty cere- sin.
Aqueous NaOH test	no ppt.	heavy ppt.	ppt.	no ppt.	ppt.	no ppt.	no ppt.	no ppt.	no ppt.	no ppt.	ppt.	heavy ppt.	no ppt.	no ppt.
Per cent. iodine absorption	4.17	9.1	7.59	7.3	5.0	7.97	7.97	7.08	8.28	9.86	9.74	11.0	4.04	3.79
Percentage KOH { For free acid .	0.78	2.1	2.23	1.79	2.01	1.9	2.01	1.39	1.95	1.9	1.99	2.57	0.72	0.67
{ For esters ...	3.02	5.82	6.15	7.5	7.95	7.7	7.27	5.72	7.26	7.44	8.86	4.14	2.46	1.90
Total KOH required	3.8	7.92	8.38	9.29	9.96	9.6	9.28	7.11	9.21	9.34	10.85	7.71	3.18	2.57
(a) Cerotic acid per cent.	5.7	15.5	16.3	13.09	14.73	13.9	14.73	10.23	14.32	13.91	15.14	18.82	5.31	4.9
(b) Myricin per cent.	36.8	70.15	74.2	90.39	95.79	93.0	87.69	70.15	87.69	89.72	106.85	49.92	29.68	13.9
Total a and b per cent.	42.5	85.65	90.5	103.48	110.52	106.9	102.42	80.38	102.01	103.63	121.99	68.74	34.99	18.8

TABLE OF RESULTS OF THE EXAMINATION OF SPECIMENS OF BEESWAX.—*Concluded.*

	15	16	17	18	19	20	21	22	23	24	25	Cuban.		
												26	27	28
S. G. at 15° C.	0.962	0.962	0.993	0.988	0.9435	0.999	0.953	0.961	0.9632	0.964	0.960	0.953	0.958	0.9635
M. P.	64.0	64.0	46.5	54.0	83.0	82.0	62.0	65.0	63.0	64.0	60.0	64.0	63.5	63.0
H ₂ SO ₄ test	pffin or cere- sin.	pffin or cere- sin.	no pffin.	no pffin.	no pffin.	no pffin.	pffin or cere- sin.	pffin or cere- sin.	no pffin.	no pffin.	no pffin.	pffin or cere- sin.	pffin or cere- sin.	no pffin.
Aqueous NaOH test	ppt.	ppt.	thick soap.	solid cake soap.	no ppt.	no ppt.	no ppt.	no ppt.	no ppt.	very heavy ppt.	ppt.	no ppt.	ppt.	no ppt.
Per cent. iodine absorption	11.26	9.48	1.39	11.75	6.5	9.1	7.16	9.61	9.99	.....	.....	9.23	8.2	10.12
Percentage KOH { For free acid. required { For esters ...	1.97	2.0	1.28	1.84	traces.	0.55	1.45	2.01	1.79	1.95	2.57	1.39	2.07	2.93
Total KOH required	6.49	6.27	19.37	19.03	6.15	6.15	5.71	7.95	7.27	8.48	7.83	5.06	5.17	7.34
(a) Cerotic acid per cent.	8.46	8.27	20.65	20.87	6.15	6.7	7.16	9.96	9.06	10.43	10.4	6.45	7.24	9.37
(b) Myricin per cent.	144	147	.....	.....	.....	.....	10.6	14.73	13.1	14.32	18.8	10.23	15.14	15.49
Total a and b per cent.	78.2	75.5	.....	.....	.....	.....	68.8	95.79	87.8	100.26	94.4	60.98	62.33	88.50
	92.6	90.2	.....	.....	.....	.....	79.4	110.52	100.9	114.58	113.2	71.21	77.47	103.99

The samples embraced in the above work were received in the course of six or eight weeks and were not selected for special notice, but are a fair criterion of the quality of wax offered on the New York market during that time, and quite up to the average for the year. The samples of Japan, Chinese, myrtle, Carnauba and Cuban wax were examined for the purpose of comparison. Some of these, as will be seen, appear to be adulterated themselves, so that should they, in turn, be used to adulterate beeswax, some very complex mixtures would result. The great variety of substances with which beeswax is liable to be adulterated renders an examination a very tedious affair, as no two or three tests can be depended upon to detect with certainty all adulterants or to prove the wax pure.

Mineral matter, sulphur, starch, flour, resin, pitch, stearic acid, stearin, Japan wax, tallow, paraffin and ozokerit, as well as various other vegetable and insect waxes, are all reported to have been used at different times, and some of them are still in frequent use. The first four mentioned are, however, rarely met with, as being too easy of detection. Of the rest, pitch and resin are not much used, owing to the extreme brittleness which they impart to the wax, but all the others mentioned are very frequently found, sometimes in large proportions. In conclusion, the author points out that, considering the inconvenience of completing an examination of this substance, with the facilities obtainable in the majority of stores, the retailer would be well advised to procure his supplies from a reputable firm, on whom he can depend to supply a good-quality article.—*Amer. Drugg.*, 44, No. 4 (Febr. 22, 1904), 103-105.

Beeswax—Use as an Excipient for Drugs for Intestinal Medication.—Maurel, adopting a suggestion of Mondière, employs beeswax as an excipient for the intestinal exhibition of such drugs as copaiba, cubebs, etc., in the form of a bolus. Thus, for instance, 10 parts of yellow wax and 20 parts of copaiba are melted together and made into a mass of suitable consistence, when cold, by the addition of sufficient powdered cubebs. Ipecac, senega and senna have also been prescribed successfully in the same manner. Under suitable precautions as to temperature of the melted wax, even pancreatin can be advantageously exhibited in this way.—*Pharm. Journ.*, July 25, 1903, 109; from *Bull. Gén. de Therap.*, 145, 221.

Honey—Origin and Formation.—Wm. A. Selser observes that the origin and formation of honey is the result of a combination, and a combination which nothing else can duplicate. (1) The nectar from the plant life. (2) The action of the bee in its own body. (3) Its deposition and evaporations. No other known sweets that could be gathered by the bee would result in honey, although the two second combinations might be present. Thus, for instance, quite a lot of very bad adulterations is palmed off on the public by feeding bees on a dilution of cane sugar. But if the question were propounded which would be the most important factor in the production of honey—the nectar or the bee—the answer would be, they in-

separably must go together. The first member of the combination, the nectar, as produced by nature under certain conditions, is a very thin, watery fluid, insipidly sweet, with very little flavor. This fluid is taken into the mouth of the bee and chemically changed, and by the secretion being mixed with the fluid supplied by large glands from the head and thorax, converting this fluid into dextrose and lævulose, resulting in fruit sugar or honey, then deposited by the bee in the little wax cells and evaporated by the action of the bee's wings under a high temperature about 50 per cent., and capped over and sealed, like a house-wife would seal fruit when it is about 75 or 85 per cent. solid, the ripe honey containing on the average about 15 to 25 per cent. of water. A great deal of honey, however, is of poor quality on account of the bee-keeper rushing his product to the market and extracting it before it is thoroughly evaporated (ripe). This causes fermentation and destroys both quality and flavor. While there are a number of methods of analyzing honey to determine its adulteration, yet the only acknowledged method to-day that has any degree of certainty in its results is that depending on its examination with the polariscope. The author has so examined a large number of samples of honey, gathered by bees in various localities and from different plants, and has thus collected data which indubitably shows the reliability of the polariscope in pronouncing upon the genuineness or adulteration of honey. —Amer. Journ. Pharm., 76, No. 6 (June, 1904), 267-271.

Honey—Simple Method of Distinction between the Natural and Artificial Product.—Dr. H. Ley, who has for some years been engaged in the comparative study of natural and artificial (adulterated) honey (see Proceedings, 1902, 899), has now devised, as the result of his observations, a method which enables the distinction of natural honey from pure artificial honeys, as well as the substitutes usually found on the market, and also the recognition of more than 20 per cent. of invert sugar or more than 10 per cent. of cane sugar, starch sugar, or molasses, to the natural product. The method depends on a characteristic color reaction when the sample of honey is diluted with twice its weight of water, filtered, and 5 Cc. of the filtrate are mixed with 5 drops of the reagent (below described) in a test-tube, which is stoppered with a cotton-plug, and *immediately* heated for 5 minutes in a boiling water-bath. If then examined, *natural honey* exhibits a dark color, is not directly transparent, but fluorescent by reflected light; if it is then shaken, the mixture becomes transparent and brown-red, and exhibits on the walls of the tube a brownish-green or yellowish-green color as it subsides. *Artificial substitutes*, such as have been mentioned, when treated in the same way, exhibit a brown to black color, remain opaque, and do not show the characteristic yellow-greenish color on the walls of the test-tube after shaking. These distinctions were obtained in 54 out of 59 samples of natural honey of undoubted source, the 5 exceptions being in each case snow-white honeys. On the other hand,

27 samples of adulterated honeys, substitutes, and suspected honeys, give colors varying from brown to violet and black, and failed to exhibit the characteristic greenish-yellow. The

Reagent for Honey, used by the author, is prepared as follows: 10 Gm. of silver nitrate, dissolved in 100 Cc. of water, are treated with 20 Cc. of 15 per cent. soda solution; the resultant silver oxide is collected on a filter, washed with 400 Cc. of distilled water, and dissolved in 10 per cent. ammonia water, adding sufficient of the ammonia water afterwards to bring the weight of the solution to 115 Gm. It must be preserved in well-stoppered vials, carefully protected from light, and under these conditions keeps fairly well. When carrying out the test, also, exposure of the solution to direct sunlight before the end of the reaction should be avoided.—*Pharm. Ztg.*, 48, No. 60 (July 29, 1903), 603-604.

Cod-liver Oil—Conditions Necessary for the Production of the Best Quality.—During a recent visit to Norway, K. Rousfield interviewed fishermen, merchants and manufacturers, and had long chats with the masters and mates of the coasting-steamers, with the one end in view, viz., to ascertain why this has been such a bad year for cod-liver oil, and to learn, if possible, whether the present scarcity is likely to be repeated. In the course of these interviews he has gained information from which he concludes that for the production of the finest brands there are four things to be taken into consideration, viz.:

1. *The Condition of the Fish Producing the Oil.*—This has been amply demonstrated this year, the present scarcity of cod-liver oil not being caused so much by scarcity of fish as by the fact that the livers are very poor and contain but little oil, and that of a poor quality, hence many more fish are required to make up the same quantity of oil.

2. *Method of Manufacture.*—In the freshness and the selection of the livers lies one of the secrets of the successful manufacture of the finest qualities of cod-liver oil. The process of extracting the oil is of equal importance. I well remember carefully studying the extraction apparatus, shown in the Norwegian Section of the Fisheries Exhibition held in London in 1883, and I was convinced then that the Norwegians were making great strides in the making of cod-liver oil. They have greatly improved since then, so that at present the best qualities of the best makers leave little to be desired.

3. *Climatic Conditions.*—Non-freezing cod-liver oil is the kind mostly in demand, and brings by far the highest prices. To produce this the oil after extraction must be filtered at certain degrees of temperature, either naturally or artificially produced, so that the stearin may be separated. The Norwegian winters are admirably suited to this operation. My experience may be different from others, and I may be wrong in my conclusions, but I have found that oil filtered largely under natural conditions is superior to oil filtered under artificially-produced temperature.

4. *Preservation of the Oil after Preparation.*—Cod-liver oil, like most edible oils, is liable to deterioration either by exposure to the air or by coming in contact with anything likely to affect the taste, and the bright tin barrels used in Norway are an ideal package for the preservation of the oil, both from contact with the air and anything likely to contaminate it.

Newfoundland oil, until quite recently, was packed in ordinary wooden barrels, and ran more risk of being spoilt by being put into casks previously used for another purpose, or if in new barrels, deriving a taste from the wood of which the cask was made, and as the public have got educated up to a high standard, they have become quick judges of any departure in taste or smell from that standard. Those of us who are old enough to remember cod-liver oil as made, say, in the fifties, do not wonder at the prejudice so often expressed by middle-aged people against cod-liver oil—a prejudice evidently handed down from father to son, and one which dies hard. The present scarcity of cod-liver oil has thrown on the market a quantity of oil made from inferior livers, which in ordinary years would have been used for the production of "cod oil." It has also stimulated into activity all the makers on our own coast, who ordinarily confined their energies to the making of cod oil, and whose plant is, in many cases, only suitable for the production of that class of oil.—*Drugg. and Chem.*, Jan. 2, 1904, 21.

Cod-liver Oil—Production and Adulteration in Norway.—A. T. Hall, discussing the method of producing cod-liver oil in Norway, and its adulteration, states that Norway has great natural advantages for the production of high-class cod-liver oil. The fishing is comparatively near land, it is conducted during cold weather, so that the livers do not decompose in the short time necessary to deliver them to the factories on shore, and the large supply of fish available ensures, as far as possible, an adequate return for the capital invested. The livers are removed from the fish during the trip from the fishing-grounds to the factory, the gall bladders are removed at the factory, the livers washed in cold water and placed in the melting-pan, which in well-equipped factories consists of a steam-jacketed vessel. Oil soon rises, and the first skimmings are the cream of the product. With higher temperature comes an increased flow with a fall in quality. In the removal of stearin, the next step in the process, the climate of Norway offers another advantage, the low temperature obviating the necessity of artificial cooling. Adulteration of the oil is effected in one of two ways: the use of livers other than those of cod in the process of manufacture, or the addition of foreign oils to the finished product. The first, if not carried too far, is extremely difficult of detection. The oils mostly used for this purpose are liver oils of the haddock, skate, coal-fish, shark, etc., also oils obtained from the whale, seal, dugong, menhaden, etc. Most of these possess a fishy odor, and resemble more or less closely cod-liver

oil. The author thinks that the tests for purity of the oil now in use are far from satisfactory.—Pharm. Era, Febr. 4, 1904, 111; from Brit. and Col. Druggist.

Cod-Liver Oil—Character of Genuine Oil and of Its Adulterants.—E. W. Mann has made examinations of the genuine cod-liver oil and of the various oils which have been by reports at one time and another used as its adulterants, assuring himself of the authenticity of the samples which, indeed, were in some cases actually prepared from the fish under the supervision of an expert cod-liver-oil manager. On inspection of the results, as given in the table, it will be noted that many of them are really excellent in flavor, color and odor, and might, as far as the old-fashioned test of taste and smell is concerned, be mixed in considerable proportions with the genuine oil without fear of detection. The two oils designated as "Hoi oil" and "Brusmer oil," are of Norwegian origin. The precise derivation of the first has not been ascertained, while the second is derived from *Brosmius brosme*.

Sp. Gr.	Iodine Absorbed.	Free Acid.	Saponification Number.	Unsaponifiable.	Reichert Figure, 2.5 Cm.	B. P. Sulphuric Acid Test, Before Stirring.	B. P. Sulphuric Acid Test, After Stirring.	HNO ₃ + H ₂ SO ₄ Test, Before Stirring.	HNO ₃ + H ₂ SO ₄ Test, After Stirring.
Cod-liver oil, Norwegian ..	0.9262	147.79	0.36	184.1	7.74	2.0	red brown, tinged violet	orange pink	vivid salmon pink
Cod-liver oil, Newfoundland.	0.9238	139.25	0.45	188.4	9.87	2.0	red brown, tinged violet	brownish pink	vivid salmon pink, but not so vivid
Cod-liver oil, Japanese.	0.9252	134.96	1.40	186.7	7.18	1.4	intense violet	bright violet	greenish brown
Whale oil.....	0.9192	92.38	2.08	188.6	7.70	0.4	intense violet, nearly black	pale brown	very pale pink
Shark oil.....	0.9200	143.50	6.09	188.5	5.46	0.8	vandyke brown	brown	brown
Haddock oil.....	0.9318	160.00	2.67	191.2	2.42	1.1	red brown	light brown	orange
Coalfish oil.....	0.9272	139.10	1.35	186.1	6.52	0.7	brown, tinged violet	orange brown	pale pink
Seal oil.....	0.9275	123.40	2.79	194.5	3.60	2.5	intense vandyke brown	pale brown	pale orange
Dugong oil.....	0.9203	66.60	2.39	197.5	3.74	2.5	brown	pale orange	very pale brown
Ling oil.....	0.9231	122.80	0.29	181.6	6.44	0.7	violet	light brown	pale brown
Menhaden oil.....	0.9301	145.80	2.50	186.1	6.73	2.2	brown	pink	light brownish pink
Hoi oil.....	0.9186	116.60	0.18	164.7	15.06	1.8	orange, tinged violet	light brown	pale orange pink
Brusmer oil.....	0.9222	130.11	0.13	180.4	4.92	1.9	violet	brown	pinkish orange

—Pharm. Journ., Dec. 5, 1903, 840.

"Fish Liver Oil"—Comparison with Genuine Cod-Liver Oils.—John C. Umney and Charles T. Bennett, having recently been offered a sample of non-freezing fish liver oil, the odor of which was not disagreeable, though not possessing the taste characteristic of Norwegian oil, and recognizing that such a product might, under certain conditions, escape detection when mixed with genuine cod-liver oil, have made experiments to determine what chemical tests are necessary to detect it, and how, by the addition of further tests to those now in the B. P., it may be excluded. The sample under examination was found to answer the tests of the B. P., 1898, with the exception of the albumen-reaction, which is usually afforded in about six hours by the best grades of non-congealing Norwegian cod-liver oil. When immersed in a freezing-mixture for two hours no cloudiness was observed during that period. The oil gave a well-marked violet color with strong sulphuric acid, and the sp. gr. came within the prescribed limits. The physical and chemical characters are shown in the table appended in comparison with samples of Norwegian and Newfoundland oils:

	Fish Oil.	Norwegian Cod-liver Oil.	Newfoundland Cod-liver Oil.
Sp. gr. at 15° C.....	0.922	0.928	0.927
Refractive index at 15° C.	1.4765	1.4828	1.4832
Saponification value.....	187.0	192.9	197.6
Iodine absorbed in 4 hrs. (P. G. test).....	148.5	137.1	136.4
Free fatty acids (calculated as oleic acid)...	3.10 per cent.	0.70 per cent.	1.55 per cent.
Fatty acids—melting-point.....	26.5° C.	23.5° C.	26.5° C.
H ₂ SO ₄	Intense purple.	Well marked purple.	Well marked purple.
HNO ₃ (fuming).....	Pale rose with slight purple color at first.	Pale rose with faint purple color at first.	Pale rose color.
One drop H ₂ SO ₄ added to 1 drop of the oil in 20 drops CS ₂	Intense purple fading in fifteen minutes.	Well marked purple, fading more slowly.	Well marked purple, fading more slowly.
HNO ₃ (B. P. test).....	Very faint albumen ring in six hours.	Well marked albumen ring formed in about six hours.	Well marked albumen ring formed in six hours.

While it is evident from the above that the fish-liver oil can be distinguished from cod-liver oil unmixed, the authors find it necessary to extend their experiments with the view of determining how small proportions of fish-liver oil can be detected in cod-liver oil. They are of the opinion that the refractive index will prove a valuable factor in detecting this and other impurities in cod-liver oil, and it will be useful if analysts will publish figures that have been obtained for other commercial samples.—Chem. and Drugg., July 4, 1903, 37.

Cod-liver Oil—Value of Refractometric Examination for the Detection of Adulterants.—Referring to the opinion expressed by Umney and Bennett in their paper on "Fish-liver Oil" (which see), that the refractive index may prove the most promising test for detecting the adulterants of cod-liver oil, E. Dowzard states that he has used this test for the past six years, and can recommend it as the best test for this purpose. From the refractometric examination of pure oils, both Norwegian and Newfoundland, the minimum refractometer number (determined in the oleo-refractometer) was fixed at + 42, but + 43 might be taken as the minimum, as only 23 samples out of 160 gave a number below + 43. The total number of samples examined by the author, from 1898 to 1903, was 213. Of these 160 were pure oils, 13 were regarded as abnormal, and 40 were adulterated. The refractive indices, at 22° C., for the pure oils ranged from + 42 to + 48; in the adulterated oils they ranged down below + 42, while the abnormal samples gave numbers over + 48 (+ 49 to + 50). For three years—1898 to 1900—no numbers were obtained over + 46; then a gradual rise took place until 1902, when a large number of samples reached + 48 to + 49. This year shows a decrease in these high numbers. It is hard to say whether a refractometer number over + 48 is indicative of adulteration or not; it would be safer to keep within the limits + 42 and + 48, as the great majority of pure oils vary between these two figures. The refractometer figures of oils likely to be used as adulterants are the following: Seal oil, + 30 to + 32; fish oil (salmon), + 19; shark-liver oil, + 29 to + 35; Pilchard oil, + 32 to + 36; and Japan fish oil, + 50 to + 53.—Chem. and Drugg., Aug. 29, 1903, 400.

Salmon Oil—Constants.—B. de Greiff gives the following constants for salmon oil, which is stated to be produced in considerable quantities in British Columbia, and to have a mild and comparatively agreeable taste: Specific gravity at 15.5°, 15.5° C., 0.92586; saponification-number, 182.8; Reichert-Meissl number, 0.55; Hehner number, 95.02; Iodine value, 161.42; iodine value of liquid acids, 197.4; unsaponifiable matter, 4.4 per cent.; free acid number, 4.93.—Pharm. Journ., Feb. 27, 1904, 246; from Chem. Zeit. Rep., 27, through Analyst, 28, 365.

Dog Fish Oil—A Substitute for Cod-Liver Oil.—A correspondent of the "Pharm. Era," writing under the pseudonym "Verb. Sap.," states that the failure of the Lofoten fisheries has raised the dog fish from a most execrated pest—being utterly useless as a food fish and a harrass to the cod-fishers on account of their destructiveness to their nets—to a rather sought-after fish. The livers have been in steady demand for some time, and while the average price paid for raw livers has been fifty cents a bucket, it has gone as high as a dollar and a quarter per bucket, at the last of the season. The oil obtained from the dog fish is not as objectionable as one might suppose. Of a pale straw color, with little odor, it is practically indistinguishable from cod-liver oil, when well made. As a

general rule, however, the fishermen who prepare it are not remarkable for the cleanliness of their surroundings, and in addition to this, they take little or no pains to remove the stearin from the crude oil. Several of the larger fish firms have put in small plants for the treatment of livers, and refining of oil. These houses have a commercial reputation to sustain, and therefore they refrain from shipping this product under any but its true designation of "fish oil." It can only be surmised what becomes of this oil when it reaches upper Canada and the United States.—Pharm. Era, Dec. 3, 1903, 572.

Artificial Cod-liver Oil—Preparation from Benne Oil.—In a review of the various suggestions that have in recent years been made to find a substitute for cod-liver oil that shall replace it absolutely in the practice of medicine, and shall at the same time be free from the objectionable taste of the genuine article, it is finally suggested that such a substitute will probably be found in sesame oil which has been iodized so as to conform in this respect to natural cod-liver oil ($= 0.003$ per cent.). In fact, any other pleasantly-tasting nutrient oil may serve this purpose if properly iodinated. Such preparations are now being supplied by manufacturers.—Pharm., Ztg., 48, No. 56 (July 15, 1903), 561-562.

Artificial Civet—A New Product.—Muehlethaler has introduced an artificial civet, which, although containing only one-third the amount of natural civet, is claimed to exactly reproduce the odor of the latter, three parts artificial being equal to two parts of natural civet. For perfuming it is recommended to be used in form of a 5-per cent. alcoholic solution.—Seifensieder Ztg., 30, 363.

Bone Tar (Oleum Cornu Cervi)—Properties and Comparison of Solubilities with Vegetable Tars.—Ed. Hirschsohn, finding little information concerning the character and properties of bone tar, has made a series of experiments with the object of supplying this information, and communicates his observations, together with a comparative table exhibiting the solubilities of this and the vegetable tars in different solvents. As shown in this table, bone tar (*Oleum cornu cervi*) is characterized by its ready solubility in the various solvents used, approaching in this respect pine tar. On shaking out with water the aqueous layer gives no reaction for furfural with aniline and hydrochloric acid; it is alkaline; with ferric chloride it gives a yellow-red color, and a precipitate with bromine water. The petroleum-ether extract, 1 : 20, gives a red color on being shaken up with a 1-per cent. solution of copper acetate. Certain samples of cheap *Oleum cornu cervi*, which gave a separation of oily drops when dissolved in some of the above-named solvents, were found to be adulterated with 20 per cent. of naphtha or naphtha residues. The respective solubilities of the different kinds of tar are shown in the following table :

Solvent.	Kind of Tar.					
	Bone.	Poplar.	Birch.	Beech.	Juniper.	Pine.
Acetone	complete.	nearly complete.	complete.	complete.	complete.	complete.
Aldehyde	turbid sol.	incomplete.	sparingly.	"	sparingly.	"
Amylen hydrate.	complete.	nearly complete.	complete.	"	complete.	"
Alcohol, 95 p. c.	"	"	incomplete.	near complete.	incomplete.	"
Alcohol, 90 p. c.	"	"	"	"	"	"
Amyl alcohol, b. p., 132° C.	"	nearly complete.	complete.	near complete.	complete.	"
Anilin	"	"	incomplete.	complete.	"	"
Ether, absolute.	"	incomplete.	complete.	complete.	"	"
Benzol, b. p., 80° C.	"	"	partly.	partly.	"	turbid sol.
Benzin, Russian.	incomplete.	sparingly.	partly.	sparingly.	incomplete.	partly.
Chloroform	complete.	incomplete.	complete.	near complete.	"	complete.
Acetic acid, gla- cial	nearly complete.	"	incomplete.	complete.	"	"
Paraldehyde	complete.	nearly complete.	complete.	complete.	complete.	incomplete.
Olive oil	"	sparingly.	"	sparingly.	"	opalescent.
Carbon bisul- phide	"	incomplete.	"	partly.	"	"
Oil of turpentine, French	"	"	"	sparingly.	"	complete.
Carbon tetra- chloride	"	"	"	"	"	incomplete.

—Pharm. Centralh., 44, No. 50 (Dec. 10, 1903), 967-968.

INORGANIC CHEMISTRY.

GENERAL SUBJECTS.

Atomic Weights—Changes in the Table for 1904.—The International Committee on Atomic Weights recommends in the table of atomic weights for 1904 two changes only from those of 1903. The atomic weight of cæsium has been altered to 131.9 ($H = 1$), and that of cerium to 139.2 ($H = 1$), in accordance with recent determinations by various workers. The values for lanthanum and iodine are still matters of controversy. The committee suggests that there is need for the "re-determination" of the atomic weights of mercury, tin, bismuth, antimony, palladium, phosphorus and silicon. A warning is issued against the use of glass vessels in determining atomic weights by processes involving the use of strong acids. An investigation into the relative merits of ordinary glass, and the so-called quartz glass, is considered most desirable.—Pharm. Journ., March 12, 1904, 366; from Proc. Chem. Soc., 19, 2.

"Chemically Pure"—Abuse of the Term.—Lyman F. Kebler, in Bulletin No. 80, Bureau of Chemistry, United States Department of Agriculture, calls attention to the prevalent abuse of the term "chemically pure." He says that the designation C. P., as used at present, is not only meaningless and worthless, but misleading in the extreme. Chemicals of the poorest character are marked C. P. Manufacturers use the term care-

lessly, and dealers will attach it to any article of a chemical nature that they think will thus be made more attractive. Such dealings are an imposition on the consumer and unfair to honest competitors. There are a number of other terms used which at present convey very little information; they are *purum*, *purissimum*, purified, twice purified and absolutely chemically pure; and even U. S. P., Ph. Br., and Ph. Ger. IV, are indifferently employed. Within recent years manufacturers have adopted a custom of marking some of their chemically pure chemicals "free from manganese," "free from sulphur," "free from iron," "arsenic-free," "free from silver," and "strictly chemically pure, free from N. and S." The marking of chemicals as free from certain impurities is certainly a step in the right direction, but the great difficulty is that many of these chemicals are free from these impurities only on the label. A recent consignment of copper sulphate, to be used in sugar analysis, delivered to the Bureau of Chemistry on the specification that it must be absolutely free from iron, was so labeled, but, nevertheless, contained this impurity in appreciable quantities. A purchase of magnesium oxide guaranteed to be free from sulphur and so labeled, contained over 2 per cent. of sulphur calculated as anhydrous sodium sulphate, and goods labeled "chemically pure sulphuric acid, arsenic-free," frequently contain this impurity. In view of the above facts it is quite evident, first, that "C. P.," or "chemically pure," with all its qualifying adjectives, at present means nothing, and its fraudulent use should be abolished; second, that no chemical should be accepted as free from a certain impurity simply because the package is so labeled; and, third, that certain specific standards for chemical reagents should be established. Such reagents should be free from all undesirable or detrimental contaminations, and this fact should be set forth on the label. It is well known that many original packages are not marked at all except by the private mark of the manufacturer. A federal law requiring that every package of chemicals be properly labeled as to name and quality would remedy this practice.—*Drugg. Circ.*, 48, No. 4 (April, 1904), 74-75.

Colloidal Metals—Description.—E. A. Ruddiman gives a description of a number of colloidal metals, such as silver, mercury, gold, bismuth and cadmium, together with the processes by which they may be obtained, which does not admit of profitable condensation, and must therefore be consulted in the original.—*Proc. Tenn. State Drugg. Assoc.*, 1903, 64-68.

NEW ELEMENTS.

Radio-active Substances—Nature and Cause of Activity.—In concluding an elaborate paper on "Radio-active Substances," which is published in weekly installments in the "Chemical News" from August 28 to December 4, 1903, and in which the entire field of discovery and experiment connected with these interesting bodies is exhaustively discussed, Mme. Sklodowska Curie, speaking for herself and M. Curie, very properly makes

the claim that their researches upon the new radio-active bodies have given rise to a scientific movement, and have been the starting-point of numerous researches in connection with new radio-active substances and with the investigation of the radiation of the known radio-active bodies. What the authors' share in these researches has been is briefly outlined in the following :

Investigation of the radio-activity of uranium compounds ; discovery of this property by thorium compounds, and making clear the atomic character of the radio-activity of the compounds of uranium and thorium !

Researches in the same direction upon a large number of substances other than uranium and thorium, and discovery by an accurate electro-metric method, that certain minerals possess activity which is not to be accounted for by their content of uranium and thorium, from which it was concluded that these minerals must contain a radio-active body different from uranium and thorium and more strongly active !

The extraction, in conjunction with M. Curie, and subsequently with MM. Curie and Bémont, of two strongly radio-active bodies—*polonium* and *radium* !

Continuous engagement upon the examination and preparation of these substances, effecting the fractionations necessary to the concentration of *radium*, and finally isolating pure *radium chloride* ; determinations of the atomic weight with a fair degree of accuracy with a very small quantity of material, and thus *proving that radium is a new chemical element* !

Investigation of the law of absorption of polonium rays, and of the absorbable rays of radium, and the demonstration that this law of absorption is peculiar and different from the known laws of other radiations ; also investigation of the variations of activity of radium salts, the effect of solution and of heating, and the renewal of activity with time, after solution or after heating.

Examination, in conjunction with M. Curie, of the different effects—electric, photographic, fluorescent, luminous, colorations, etc.—produced by the new radio-active substances, and establishment of the fact that radium gives rise to rays charged with negative electricity ! Surely, with such a record for research and work accomplished, the following explanation of the

Nature and Cause of the Phenomena of Radio-Activity, given by Mme. Curie in the paper quoted, will be received with unqualified confidence :

From the beginning of research upon the radio-active bodies, and when the properties of these bodies were yet hardly known, the spontaneity of their radiation presented itself as a problem having the greatest interest for physicists. To-day we have advanced considerably in the understanding of radio-active bodies, and are able to isolate one of very great power, viz., radium. With the object of making use of the remarkable properties of radium, a profound investigation of the rays emitted by radio-active

bodies is indispensable ; the various groups of rays under investigation present points of similarity with the groups of rays existing in Crookes tubes : cathode rays, Röntgen rays, canal rays. The same groups of rays are found in the secondary radiation produced by Röntgen rays, and in the radiation of bodies which have acquired radio-activity by induction.

But if the nature of the radiation is actually better known, the cause of this spontaneous radiation remains a mystery, and the phenomenon always presents itself to us as a profound and wonderful enigma. The spontaneously radio-active bodies, and in the first place radium, are sources of energy. The evolution of energy, to which they give rise, is manifested by Becquerel radiation, by chemical and luminous effects, and by the continuous generation of heat. The question often arises as to whether energy is created within the radio-active bodies themselves, or whether it is borrowed by them from external sources. No one of the numerous hypotheses arising from these two points of view has yet received experimental confirmation. The radio-active energy may be assumed to have been initially accumulated and then gradually dissipated, as happens in the case of long-continued phosphorescence. We may imagine the evolution of radio-active energy to correspond to a transformation of the nature of the atom of the active body ; the fact of the continuous generation of heat by radium speaks in favor of this hypothesis. The transformation may be assumed to be accompanied by a loss of weight and by an emission of material particles constituting the radiation. The source of energy may yet be sought in the energy of gravitation. Finally, we may imagine that space is constantly traversed by radiations yet unknown, which are arrested in their course by radio-active bodies and transformed into radio-active energy.

Many reasons are adduced for and against these different views, and most often attempts at experimental verifications of the conclusions drawn from these hypotheses have given negative results. The radio-active energy of uranium and radium apparently neither becomes exhausted nor varies appreciably with lapse of time. Demarçay examined spectroscopically a specimen of pure radium chloride after a five-months' interval, and observed no change in the spectrum. The principal barium line, which was visible in the spectrum, indicating the presence of a trace of barium, had not increased in intensity during the interval, showing, therefore, that there was no transformation of radium into barium to an appreciable extent. The variations of weight announced by M. Heydweiller in radium compounds cannot yet be looked upon as established facts. Elster and Geitel found that the radio-activity of uranium is not affected at the bottom of a mine-shaft 850 M. deep ; a layer of earth of this thickness would therefore not affect the hypothetical primary radiation which would be excited by the radio-activity of uranium. Mme. and M. Curie have determined the radio-activity of uranium at midday and at midnight,

thinking that if the hypothetical primary radiation had its origin in the sun it would be partly absorbed in traversing the earth. The experiment showed no difference in the two determinations.

Radio-Active Elements—New Discoveries.—Sir William Ramsay announces the discovery of a hitherto unknown element in a mineral received from Ceylon, which possesses marked radio-activity. This mineral was bought in the hope that it would have a high content of radium. There is a trace of radium present, due, no doubt, to the spontaneous change of the uranium which the mineral contains. But the radio-activity due to this source is certainly not 5 per cent. of the total. The period of decay of the emanation appears to point to the presence of a radio-active element closely resembling thorium X. The half value is 50 or 51 seconds, and while this is not quite the time for the decay of thorium emanation, it very nearly approaches it; at present the balance of evidence appears to point to the presence of an element closely resembling thorium, but not identical with it. The total radio-activity, moreover, is much greater than can be accounted for by the supposition that the one consists of pure thorium. Assuming that the element is a tetrad, which is probable from its behavior, it undoubtedly possesses an equivalent approaching the highest number (44.7), and for this there is a gap in the periodic table between cerium and thorium; one at least of the elements present (supposing that there is more than one present) will probably have an atomic weight of about 177, preceding tantalum (182.5) in the horizontal row of the periodic table.

Quickly following the above discovery of Sir William Ramsay is the discovery of two radio-active elements by an American chemist, Professor Charles Baskerville, in the monazite sand of North Carolina. By distilling thorium oxide—which is produced in North Carolina to the amount of half a million dollars' worth—in a quartz tube with carbon and chlorine, he produces substances of specific gravities and atomic weights differing from those of substances in use. What he calls

Berzilium appears in a greenish vapor, which he condenses. The other element,

Carolinium, adheres to the quartz in crystals, leaving a certain remnant of thorium. The importance lies less in adding two more to the seventy odd elements than in adding two to half a dozen known radio-active, self-luminous substances. Dr. Baskerville has 5 grams of the pinkish powder called after his State, and $2\frac{1}{2}$ grams of the greenish powder which takes its name from Berzilius, who saw its vapor without identifying or solidifying it. Commentators discover a commercial value in the application of the new form to illumination, possibly leading to some new departure like gas mantles. In some experiments before the Chemists' Club, carolinium and berzilium each glowed through enclosing tubes of copper, brass, rubber, iron and glass, all covered with cloth. Whether the world can supply any other source of the discovered substance than North Carolina's monazite sand is an interesting question.—Chem. and Drugg., April 16, 1904, 635.

Radio-Activity of Matter—Possible Sources of Supply of Raw Material.
—Clemens Winkler discusses and reviews the subject of the radio-activity of matter and the facts and theories that have been advanced since the discovery of the phenomenon of radio-activity. This discovery has opened up to physical, and presumably to chemical research also, a region which promises to surpass all our expectations in the peculiar and striking characteristics which it will reveal. We are confronted with a source of energy which seems to flow out continuously and spontaneously from itself, whilst we can only guess at its origin; with manifestations of energy which do not resemble those already known either in character or mode of expression; with substances which are like the elements in all particulars, yet seem to possess a new nature. The most typical of these substances is radium, which in the opinion of its discoverer, Mme. S. Curie, is to be regarded from a chemical point of view as a new element, and by its inclusion in the Atomic Weight Table of 1904 of the International Atomic Weight Committee is recognized as such. But far less is definitely known about the other radio-active substances which have been discovered, such as polonium, actinium, and the as yet unnamed bodies which have been supposed to have been discovered, for example, in the earths of the cerium and yttrium group. This uncertainty is quite explicable if we consider that for the performance of all researches up to the present, at the most only very small quantities of pure or even enriched substances have been at the disposal of the investigators, for which reason the study of their properties, especially of those to be regarded as chemical, has been rendered much more difficult. Considering the excitement about radium which now pervades the world, it is rather galling for chemists that they cannot say more about this element, which was discovered almost six years ago, than that it is exactly like barium, except that it has a higher atomic weight, and possesses the wonderful spontaneous radiation. The chemical nature of radium is as yet almost unknown, and yet questions are often put about it, especially in those places in which pitchblende has been discovered, and where people are already dreaming of a most promising "radium mining" and a future "radium industry." So far as is yet known the occurrence of radio-active substances is entirely bound up with uranium. The material for obtaining radium and other radio-active substances has hitherto been chiefly furnished by the residue during the working of pitchblende for uranium preparations at the "K. K. Oestereich-Uranfabrik" in Joachimsthal. From the chemical relationship, so far as observed, of the barium and radium compounds, it must, however, be concluded that the heavy spar accompanying the pitchblende is the real carrier of the radium contained in the Joachimsthal ore. If such be the case, the radium contained in the heavy spar will pass into the barium chloride prepared from it, and then, even if it were ever so small in quantity, it could not be difficult to

concentrate it by fractional crystallization of this salt on a large scale—although experiments undertaken by Mme. Curie have so far only given negative results. But even if radium for some unknown reason can only occur with uranium, it must, at any rate in the Erzgebirg, be found comparatively widely distributed, for in this region rock, particularly granite, is abundant, in which the presence of small quantities of uranite and urano-circite, possessing activity on the photographic plate, may be shown. Hence it seems possible to discover in that region a raw material which may be successfully worked for radio-active substances. And by the preparation of these latter, pure in larger quantities, it may become possible to determine the nature of radio-activity, and to establish beyond any doubt the existence of radio-active elements of special nature and definite chemical behavior.—Chem. News, June 17, 1904, 289-291.

Radium—Isolation.—In the course of her masterly review of the radio-active substances (which see), Mme. Curie tells how she isolated radium from pitchblende residue. The extraction of the ore, which is expensive, is carried out in the mine of Joachimsthal, in Bohemia, for the isolation of uranium. The Austrian Government, to whom the mine belongs, presented her with a ton of this residue for her research, and authorized the mine to give her several tons more of this material. It chiefly contains sulphates of lead and calcium, silica, alumina, and iron oxide. In addition, nearly all the metals are found in greater or smaller amount (copper, bismuth, zinc, cobalt, manganese, nickel, vanadium, antimony, thallium, rare earths, niobium, tantalum, arsenic, barium, etc.). Radium is found in this mixture as sulphate, and is the least soluble substance in it. Mme. Curie gives the details of the process of its isolation.—Chem. News, 88 (1903), 135.

Radium Spectrum—Identification as that of Nitrogen.—Sir William and Lady Huggins recently communicated a paper to the Royal Society, in which it was announced that a photograph of the spectrum of radium had been obtained. The spectrum was at first thought to be helium, but subsequently was identified as the well-known band spectrum of nitrogen. This conclusion lends no support to the theory which has been put forth that radium generates helium by the break-up of its own molecules.—Chem. and Drugg., Aug. 29, 1903, 394.

Radium Emanations—Explanation of the Phenomena.—Prof. E. Rutherford communicates a note in explanation of the phenomena of radio-activity. He concludes that the radium emanation is the active principle of radium, for about three-quarters of the activity of radium is due to it. Thus, a large proportion of the radiations from radium is a direct result of the changes occurring in the very minute amount of matter constituting the radium emanation. If ever 1 Cc. of the radium emanation can be collected at one spot, it will exhibit some remarkable properties. The powerful radiations from it would heat to a red heat, if they would not melt

down, the glass-tube which contains it. This very rapid emission of energy, in comparison with the amount of matter producing it, would continue for several days without much change, and would be appreciable after a month's interval. The very penetrating rays from it would light up an X-ray screen brilliantly through a foot of solid iron.—Chem. and Drugg., Aug. 29, 1903, 394 ; from "Nature."

Radium—Emission of Three Kinds of Rays.—In a paper entitled "Researches Relating to Radium," Frederick Soddy, referring to the three kinds of rays emitted by radium, says: The α particle is an integral part of the heavy radium atom which, after disintegration, forms a new and lighter atom, viz., that of the emanation. This suffers a second disintegration, expelling more α particles and changing into the matter which causes the "excited activity." Owing to the average life of the emanation atom being short—only 5.79 days—its energy is liberated so rapidly that a correspondingly small quantity can be detected. With regard to the "spinharscope" effect of the α ray when it impinges on a zinc-blende screen, discovered by Crookes, it appears probable from the work of Becquerel, Tommasina and others, that the scintillations are not caused, as was at first thought, by the direct impact of the individual α particle, but are due to cleavages provoked in the crystals of the blende by the bombardment, each cleavage, rather than each impact, giving rise to a flash of light. The recent discovery of Rutherford & Barnes that more than 70 per cent. of the energy evolved from radium is due to the insignificant amount of emanation and the products of its further change, less than 30 per cent. being due to the element itself, follows as a direct consequence of the disintegration theory. It furnishes, it would seem, an almost unanswerable argument against the view that the energy evolved from radium is derived from an external source of unknown nature. Mr. Soddy further points out that the helium occluded in various minerals is now accounted for by the disintegration theory respecting radio-active minerals, and it appears that this occurrence suggested to Ramsay and himself the investigation which led to the demonstration that radium-emanations consist in part of helium. The occluded gas is not found in minerals which are not radio-active.—Chem. and Drugg., Febr. 6, 1904, 232.

Radium Radiations—Question of Inexhaustibility.—Sir Oliver Lodge explains that radium does not upset scientific doctrines. Those who think that it is an inexhaustible store of energy and is generating energy afresh, which has not previously existed, are mistaken. The radium atom is in itself a large store of energy, just as the sun is a large store of energy, and the radium atom occasionally gives it out in perceptible fashion and to a very surprising extent. But it is not every radium atom which is doing that; it is only about one in a million. Radium is always emitting its own internal energy, which is breaking down into other substances. Radium has been discovered in the act of decadence, and the decaying of a thing

implies at one period a growth. The birth of matter, as well as the death of matter, is what we are now looking for.—Chem. and Drugg., Feb. 6, 1904, 232.

Radium—Action of its Rays on Colloids, Ferments, etc.—V. Henri and A. Mayer find that the radium rays precipitate negative colloids, such as colloidal silver, but are without influence on positive colloids, such as ferric hydrate. Oxyhæmoglobin is transformed by them into met-hæmoglobin and slowly precipitated. Oxycarbonated hæmoglobin is unaffected. The ferments invertin, emulsin and trypsin gradually lose their activity when exposed to radium rays, and after several days' exposure become inert. The red corpuscles of the blood are profoundly affected. Those which have been exposed to the radium rays are easily affected by various solutions, giving up their hæmoglobin and salts much more readily than normal corpuscles.—Pharm. Journ., April 23, 1904, 548; from Comp. rend., 138, 521.

Radium Rays—Action on Viper Venom.—C. Phisalix finds that radium rays exert a similar influence on viper venom to that observed by Henri and Mayer on ferments. A 1:1000 solution of the venom was divided into four portions; one was not exposed; the other three were treated with radium rays for six, twenty and fifty-eight hours respectively. The four solutions were then injected in the same dose into four guinea pigs. That which received the unexposed solution died in ten hours; the solution exposed for six hours was fatal in twelve hours; the third, exposed for twenty hours, took twenty hours to produce death; and the fourth, and longest exposed, was without fatal effect even after a second dose of the exposed venom.—Pharm. Journ., April 30, 1904, 581; from Comp. rend., 138, 526.

Radium.—Effect of its Rays on the Lower *Fungi*, which see under "Materia Medica."

Radium Rays—Inefficacy in Cancer.—Dr. H. G. Plimmer records his experience of seventeen cases of cancer which were treated with 30 Mgm. of radium bromide presented by Lord Iveagh. The effect on the skin varied in different cases: an exposure of ten minutes was generally sufficient to produce blistering and then scabbing, and under the scab there was found a very slow-healing surface. The radium had apparently no effect in causing or relieving pain. Three of the patients died. Mr. Plimmer observes that the cancer nodules decrease in size under the influence of the radium, but it is remarkably difficult to get rid of the last bit of the nodule, probably on account of fibrous changes; for his conclusion appears to be that the emanations from radium only act upon young and rapidly growing cells, and the older cells, especially if surrounded by fibrous tissue, are less easily affected.—Chem. & Drugg., May 7, 1904, 760; from Lancet, 1904, 1046.

Radium—A Source of Profit to the Pharmacist.—F. H. Glew, a London pharmacist, turns radium to a source of profit, not by selling it as merchandise, but by hiring it out to physicians, charging a certain price per hour for its use. The enormous cost of radium precludes its outright sale for this purpose to the patient, and even physicians, unless they are specialists in diseases for which radium is believed to be useful, will hardly be willing to invest £7, or more, in a 5 Mgm. tube of radium bromide. Mr. Glew calls attention to the shameful adulteration of this compound which is even now practiced, and describes a simple electroscope which he has constructed for testing the radium bromide purchased, giving detailed instruction for making such an instrument, which is also shown in a cut accompanying the original paper.—*Pharm. Journ.* March 26 and April 23, 1904, 439 and 549.

Referring to Mr. Glew's plan to let out a tube of radium to physicians for a consideration, Sir Wm. Ramsay observes that "there is so little radium," that it appears a good way of extending its use. He does not think there is much danger of misuse in unskilled hands. If applied to the skin for too long, burns, or dermatitis, might result, but if used discreetly there is little danger. There is not enough of it to allow of ill results generally.—*Chem. & Drugg.*, April 16, 1904, 635.

Radium—Development of Heat.—F. Giesel has confirmed the observation of the Curies concerning the development of heat by radium in the following simple way: If a thermometer is lowered into a glass flask containing 0.7 Gm. radium bromide, in a short time it rises 5° above the temperature of the surroundings, and remains at this temperature as long as it is kept in the flask. When held over a capsule closed with a sheet of mica and containing 0.3 Gm. radium bromide, the thermometer showed an increase of temperature of almost 2°, if it was protected from currents of air.—*Chem. News*, Aug. 7, 1903, 61; from *Berichte d. Deutsch. Chem. Gesell.*, 1903, xxxvi., 2368.

Radium—Occurrence in Mineral Water.—In a paper read before the Royal Society, R. J. Strutt communicates the results of a study on the radio-activity of certain minerals and mineral waters. He found the red deposit collected in the King's Well at Bath to be markedly radio-active, and he tells in detail the steps he took to determine whether the water itself contained any radium in solution. There could be little doubt that there must be traces left in solution after the deposit had subsided out. But since the Bath water contains abundance of sulphates, and since radium sulphate is one of the most insoluble salts known, there could not be more than the merest traces present. The sulphate of barium is very much less soluble than that of strontium. And presumably the sulphate of radium is much less soluble still. About ten litres of the Bath water was evaporated to dryness. The resulting saline residue was sealed up in a hard glass tube, and left for about a fortnight to generate a stock of

emanation. On heating, a distinct emanation was obtained, giving several times the rate of leak that air did. A deposit similar to that from the Bath water, but black in color, can be collected from the source of the hot springs of Buxton. It has been analyzed by Dr. J. C. Thresh, and on being examined was found to contain radium also, the proportion present being not very different from what was found in the case of some of the Bath deposits. It is further calculated that the annual delivery of radium from Bath water amounts to about a third of a gram. The spring delivers 100 cubic feet of gas a day, and a thousandth part of this is helium, so that about 3 litres of helium is given off daily, or about 1,000 litres per annum. Neither Cheltenham saline water nor the deposit has as yet yielded this investigator any confirmation of the presence of radium.—Chem. News, June, 1904.

Radium Bromide—Communication of Phosphorescence to Common Salt.—W. Ackroyd has found that radium bromide, when inserted, enclosed in a tube, into common table salt contained in a wooden box, will impart phosphorescence, plainly observable in the dark, to the salt in the course of a few hours and at the ordinary temperature. The portions of salt round the tube are at the same time turned to a faint buff or ochre tint.—Pharm. Journ., Aug. 8, 1903, 237; from Nature, 68, 269.

Actinium — Evanescent Radio-Activity.—According to A. Debierne's observations, the radiant activity of actinium emanations, and the induced radio-activity they give rise to, are at once distinguished from those of radium by their rapid diminution. Careful measurements show that whereas radium emanations lose one-half of their radio-activity in four days, both the emanations themselves and the radio-activity they induce in the case of actinium are diminished, in the same degree, in 3.9 seconds. The measurement was effected by noting the ionization of gases produced by means of actinium radiations, which is very intense and easy to determine, and is the most characteristic property of the emanations. In addition to these actinium rays, the compound element appears to give off another form of radiant energy, the diminution of the activity of which is much slower, taking some days to be reduced to one-half. It is possible that the source of this energy is another body accompanying actinium.—Compt. rend., 138, 414.

Emanium—A Strongly Radio-Active Element Presumably Allied to Lanthanum.—F. Gissel states that since his investigation in 1903 concerning the strong radio-activity of a substance which he has termed "emanation substance," the investigation of the spark spectrum of this substance, by Runge and Precht, has proved that it consists essentially of lanthanum with a little cerium. Thorium, barium, and radium were not present. His own experiments and observations since then, which are described, have convinced him that the "emanation substance" contains a new radio-active element, possessing all the characteristics of a primarily

active body, which is presumably allied to lanthanum, and for which he proposes the name "emanium."—Chem. News, June 3, 1904, 268; from *Berichte d. D. Chem. Ger.*, 1904, 1696.

Polonium—Is Probably Bismuth acted upon by Radium.—Having in former researches confirmed the observation made by Marckwald (1902) that metallic bismuth, which is immersed for some time in a hydrochloric acid solution of Curie's bismuth polonium, acquires to a remarkable extent the property of emitting α -rays, F. Giesel, guided by the opinion, which he had previously expressed, that polonium may be bismuth acted upon inductively by radium, has made careful experiments, which confirm him in this belief. He finds that it is now easily possible to impart to bismuth, by *momentary* contact with radium, properties which exactly resemble those produced by polonium. The platinum metals are affected in the same way. If a freshly-cut piece of bismuth is placed into a solution of 0.01 Gm. of radium bromide in 1 Cc. of water, after remaining there for one or two days, the bismuth shows strong α -radiation and no β -radiation, after the greatest care has been taken to remove every trace of radium from the bismuth. The non-appearance of β -radiation, after keeping for two weeks, may perhaps be employed as a control experiment for demonstrating the absence of radium.—Chem. News, Aug. 7, 1903, 61; from *Berichte*, 1903 (xxxvi), 2368.

OXYGEN.

Oxygen—Detection in Aqueous Solution.—A. Kaiser makes use of a solution of ferrous sulphate in boiled water acidulated with sulphuric acid for the detection of dissolved oxygen in water, the reagent being added to a flask of the water to be examined, an excess of caustic potash solution added, and the mixture shaken. In the presence of much oxygen the precipitate becomes yellow from conversion into ferric hydroxide, greenish in presence of little oxygen, and remains greenish-white in the absence of oxygen.—Pharm. Journ., Aug. 29, 1903; from *Chem. Ztg.*, 27, 663, through *Journ. Soc. Chem. Ind.*

HYDROGEN.

Hydrogen Peroxide—Determination of Available Oxygen.—J. McLachlan states that the determination of the available oxygen in a solution of peroxide of hydrogen by an acidified solution of potassium permanganate is utterly untrustworthy. Determinations have been made of the available oxygen of manganese dioxide (1) in its original state, (2) after being boiled with a solution of hydrogen peroxide, (3) after being boiled with a solution of hydrogen peroxide and sulphuric acid, the process employed being the oxalic acid method, in which a known weight of manganese dioxide, mixed with a known volume of a normal solution of oxalic acid, and excess of sulphuric acid (1 in 3) is heated until the whole of the dioxide is decomposed, and the excess of oxalic acid then determined by a

standard solution of potassium permanganate. The hydrogen peroxide solution should be added only after the manganese dioxide and sulphuric acid are thoroughly mixed. The results indicate that (1) the manganese dioxide is not decomposed by the hydrogen peroxide in accordance with the equation $\text{MnO}_2 + \text{H}_2\text{O}_2 = \text{MnO} + \text{H}_2\text{O} + \text{O}_2$, as in reality only a portion of the oxygen is evolved, (2) the presence of sulphuric acid is absolutely essential, for without it the foregoing reaction does not occur.—Pharm. Journ., Dec. 5, 1903, 841; from Proc. Chem. Soc., 19, 216.

Hydrogen Peroxide—Fixation in Saline Compounds in Place of Water of Crystallization.—R. Willstätter describes molecular combinations by hydrogen peroxide with various salts, in which it appears to replace water of crystallization. Thus, if ammonium sulphate be dissolved in a 30 per cent. solution of hydrogen peroxide and placed over sulphuric acid in a desiccator, beautiful prisms crystallize out, having the composition $(\text{NH}_4)_2\text{SO}_4 \cdot \text{H}_2\text{O}_2$. The crystals smell like ozone, and, though they effloresce in air, and more quickly in vacuum, they keep well in closed vessels. A similar compound with sodium sulphate, having the formula $\text{Na}_2\text{SO}_4 \cdot \text{H}_2\text{O}_2 \cdot \frac{1}{2}\text{H}_2\text{O}$, has also been obtained, and also with alum, aluminium sulphate, borax, and sodium acetate. These compounds may, perhaps, replace the per-sulphates and per-carbonates for technical purposes, and for medicinal purposes they offer some advantage in that their strength and composition can be easily determined. They also give up their hydrogen peroxide to ether and other solvents, and may, therefore, facilitate the carrying out of reactions with peroxides in indifferent solvent media.—Pharm. Journ., Nov. 28, 1903, 777; from Ber., 36, 1828.

Solid Hydrogen—Probable Crystallinity.—In continuation of previous experiments made to determine whether solid hydrogen formed definite crystals, Morris W. Travers finds that while there is no direct evidence of the formation of crystalline hydrogen, his experiments lead to the belief that solid hydrogen is a crystalline substance and not a pseudo-solid. The sharpness with which the solid hydrogen is formed, and the constancy of the apparent melting pressure are distinct evidence in favor of this conclusion, though it must be allowed that the rate of change in viscosity, when the temperatures are measured on the Centigrade scale, will probably appear to be more rapid at low temperatures than at high temperatures.—Pharm. Journ., April 16, 1904, 517; from Nature, 69, 477.

Water Analysis—Importance of Determining the Absence of Ammonia and Nitric Acid in Filter Paper.—P. Soltsier calls attention to the contamination of filter paper, not only by nitric acid, as has been heretofore observed, but also by ammonia, these being frequently present even in the best ash-free sorts of filter paper. The observation is of particular importance in water analyses in which the presence of either of these in the filter paper used is a fruitful source of errors. In the author's experience the two substances are invariably found together in the paper.—Pharm. Ztg., 49, No. 15 (Feb. 20, 1904), 156.

Water—Refined Methods of Purification.—William G. Toplis discusses the technical advances that have been made during the past few years in hygienic purification of water. In this connection it is necessary that a frequent search should be made for certain organisms of the commensal species, not in the water applied to the filter, but in that which passes from it—the presence or absence of the organisms here being a certain indicator of the efficiency of the filter. The organism sought is the colon bacillus,

Bacillus coli communis, which is invariably found in sewage, and which has many features in common with the *Bacillus typhosus*. It is, therefore, desirable to be possessed of a speedy, certain means of identifying the colon bacillus, and several such, based upon its cultural characteristics, have been used with advantage. Thus, when this bacillus is grown in neutral milk, colored decidedly blue with tincture of litmus, the blue color becomes red, and a firm coagulum occurs in the test-tube after eighteen to twenty-four hours' cultivation in the incubator. This red color is due to a change in the reaction of the milk, caused by the transition of the sugar of milk to lactic acid through the agency of the colon bacillus. Advantage is taken of this feature. Plates are made of agar-agar, containing, in addition to beef bouillon, sugar of milk, and strongly colored with blue litmus. The plates are prepared by fusing a tube of this media, cooling it to blood heat, adding 1 Cc. of the filtered water to be examined, shaking gently but thoroughly and pouring it into the plate. After it is set hard, it is placed into the incubator and cultivated for eighteen to twenty-four hours, when any colon bacilli developed will be made manifest by red colonies on the plate, with a considerable red area surrounding them (see also Dr. Robin's paper on "Water Analysis").

With regard to the science of water purification, the author observes that it is many-sided, and each side has its peculiar difficulties. This seems to be particularly true of the Philadelphia project, where the wide limitations and the constantly varying amounts of suspended matter carried by, particularly, the Schuylkill River, serve to make a very complicated problem. This problem, it appears, is in a fair way of being solved by the use of preliminary filtration in conjunction with sedimentation before passing the water to the hygienic filters. Such a preliminary filter is in operation at the lower Roxborough filter plant, doing very satisfactory work in a practical way, and presenting some very novel features. The walls of the container are of concrete construction, and it is divided into about ten elements, which are controlled separately, so that each can be cleaned without interfering with another. The filtering material consists of several sizes of broken slag; the larger at the bottom and the smaller sizes toward the top. On the surface of the slag is placed a layer of sponge clippings 1 foot in thickness, but compressed to about 6 inches and held down by a lattice of woodwork over all. This sponge or elastic

layer, as it is called, really constitutes the strainer, while the slag divides the water into innumerable small streams before it reaches the sponge layer, because the water is entered at the bottom and passes upward through the various layers. This device filters water at the rate of 45,000,000 gallons per acre per day, of such a quality that it enables the hygienic filters to deliver clean and wholesome water at the rate of 6,000,000 gallons per acre per twenty-four hours—exactly doubling the capacity of these filters when not provided with the preliminary filter or straining device. The cleaning of the sponge layer is accomplished by the aid of machinery, the outfit bearing a strong resemblance to a well-equipped laundry, and is accompanied by a small, but not serious loss of sponge material.—*Amer. Journ. Pharm.*, 76, No. 3 (March, 1904). 116–121.

Water Analysis—Methods and Interpretation.—Dr. A. Robin, bacteriologist of the City Water Department, Wilmington, Del., discusses the methods of water analysis and their interpretation as applied in this Department. The average consumer judges of the quality of the drinking water by means of his special senses of sight, smell and taste. Water which is turbid or emits a disagreeable odor is unreservedly condemned, while clear, sparkling water free from odor is just as unqualifiedly pronounced pure. Yet nothing is more fallacious. Water that is clear and sparkling may contain the germs of typhoid fever or may be polluted with sewage, while a turbid water may be entirely wholesome, and a disagreeable odor may be due to inoffensive vegetable compounds or harmless algae. This evident inability to form a ready judgment of the quality of drinking water has led the sanitarian to seek the aid of the chemist, who, it was supposed, could readily detect by means of chemical analysis the injurious substances in the water under suspicion. But here again the findings are purely relative, and must be properly interpreted before they can be of any value, while much depends on the erudition and ability of the chemist to so interpret and connect the evidence as to make out a clear case for or against the suspected water. There are in fact a number of serious objections to the data obtained by chemical analysis, and false judgment is liable to be reached unless these data are supported by the more decisive information derived from a bacteriological examination. And even here we are liable to err in detecting dangerous pollution if we were to depend upon a single factor; a combination of factors, with their proper grouping and interpretation, alone being necessary to forge the chain of evidence that will place the verdict beyond a reasonable doubt. The introduction of Koch's plate method of isolation of bacteria clears up the bacteriological examination amazingly, and this, in conjunction with the chemical examination, gives satisfactory results under the following procedure: The suspected water having been subjected to a chemical analysis, an adequate portion—1 Cc. or less—is plated in gelatin, in Nährstoff Heyden agar, in litmus lactose agar, in carbollic acid lactose

agar, and in neutral red lactose bouillon. The "carbolic acid lactose agar" is made by the addition of 0.05–0.1 Cc. of Parietti's solution (hydrochloric acid, 4 Cc.; 5 per cent. solution of carbolic acid, 100 Cc.) to 5 Cc. of the lactose agar. The "neutral red lactose bouillon" is made by adding 10 Cc. of a 1 per cent. solution of neutral red to 1 liter of a 1 per cent. lactose bouillon. The gelatin and the Nährstoff Heyden plates are kept at 20° C., and the others at 37° C. The gelatin plates are counted at the end of two days, the Nährstoff Heyden agar plates at the end of nine days, the litmus lactose agar plates at the end of twenty-four hours, and the carbolic acid lactose agar plates at the end of forty-eight hours. By using these several "media" it is aimed to demonstrate:

(1) The presence of organic pollution by the combined chemical analysis and bacterial count, the count on the gelatin plate serving as a compare with the counts obtained by other observers who have used gelatin, while the Nährstoff Heyden agar shows the total number of bacteria.

(2) The presence and number of bacteria which develop at 37° C., and the presence and number of red colonies, which may be either *B. coli communis*, Houston's *Streptococcus*, or some other sewage organism producing acid—this information being furnished by the litmus lactose agar plate.

(3) The presence and number of bacteria which resist the addition of carbolic acid, as *B. coli communis*, or some other equally resistant micro-organism which could not be an ordinary water saprophyte. This information is indicated by the carbolic acid lactose agar.

(4) The absence or possible presence of *B. coli communis*, as indicated by the production or non-production of gas and characteristic reaction with the neutral red lactose bouillon.

Given a water which shows on chemical analysis organic pollution, and which shows a large number of bacteria on gelatin and a considerable number on the litmus and the carbolic acid plates, together with red colonies on the former and production of gas plus characteristic reaction with the neutral red plates, *such a water may be pronounced polluted with sewage* beyond a reasonable doubt. The details of the different operations involved in the proposed method of water examination can be profitably consulted only in the original paper, which see in Amer. Journ. Pharm., 76, No. 3 (Mar., 1904), 101–116.

Drinking Water—Purification on the March.—Vaillard calls attention to a method proposed by a French sanitary commission for purifying drinking water for troops on the march. Rapid boiling being out of the question, it is proposed to sterilize the liquid by chemical means. Chloride of lime, employed in Austria and Germany, and bromine require too much time and too many delicate operations, and the most satisfactory chemical for the purpose is found to be free iodine, which destroys filamentous bacteria in ten minutes. The iodine is applied in the nascent form, being

liberated in the water itself by dissolving a set of compressed tablets prepared for the purpose, and forming a part of the equipment of one man in each division. Three packages of tablets are provided, the first colored with methylene blue and containing .1156 Gm. of a dry mixture of 10 Gm. of potassium iodide and 1.156 Gm. of sodium iodate; the second red tablets containing each .01 Gm. of tartaric acid, and a third, white tablets containing each .116 Gm. of sodium hyposulphite. In use a red and a blue tablet are dissolved in the water, and the iodine liberated permitted to act for some minutes; a white tablet is then added, which reduces the excess of iodine and removes all disagreeable taste.—Pharm. Era, Oct. 1, 1903, 344.

Water—Technical Analysis.—In a practical paper on the technical analysis of water, W. E. Ridenour observes that the manufacturers of special chemicals require the analysis of a water to be stated in grains per U. S. gallon, and that two analyses of the same water made at the same time shall not vary more than $\frac{1}{10}$ grain on each constituent. The author describes in some detail the scheme of analysis used in the laboratory of the Geo. W. Lord Company, and gives the methods employed for the determination of the total solids, silica, iron oxide and alumina, calcium oxide, magnesia, the sulphates, sodium chloride, calcium, magnesium and sodium carbonate combined, and free carbonic acid. In the report of the analysis the different bases and acids found in solution in the water must be given combined, according to their chemical affinities, and as they are supposed to exist in natural water. Different chemists have different schemes of uniting bases and acids, which should not be, although a certain latitude must be allowed to the analyst's discretion. The most rational method would be to state the acids and bases separately, but this method would not be accepted by the manufacturer, to whose business mind the elements themselves have no meaning. The author states the magnesium found as magnesium carbonate as far as possible, this combination having been proven to exist in preference to magnesium sulphate. The remainder of the carbonic dioxide determined by titration is calculated as calcium carbonate and deducted from the amount of calcium oxide found. The remainder of the calcium oxide is stated as calcium sulphate and deducted from the barium sulphate found. But each water requires individual study, and if a sample of sediment formed by the water is also examined, it will decide how a certain base and acid exist in the water.—Amer. Journ. Pharm., 76, No. 3 (March, 1904), 121-125.

NITROGEN.

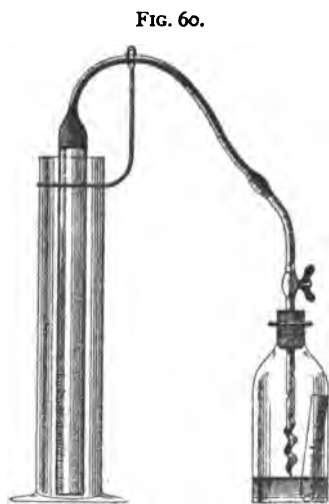
Nitrogen—Determination by the Kjeldahl Method.—Doubt having been cast in a recent paper of Kutcher and Stendel on the value the Kjeldahl method for the determination of nitrogen in various organic substances, such as creatinine and uric acid, R. B. Gibson has conducted a series of experiments which show that uniformly satisfactory determinations can be readily made if care is exercised to secure a proper decomposition and

oxidation of the substances under examination. The results obtained by the Kjeldahl method, however, should not be accepted without verification by other methods, in the case of substances of unknown structure.—*Journ. Amer. Chem. Soc.*, 26 (1904), 105.

Nitrogen—Modification of Kjeldahl Method of Determination.—Denigès recommends the following method for the determination of nitrogen which, while resembling Kjeldahl's method, dispenses with the distillation. The substance is heated with sulphuric acid and potassium oxalate until the liquid is decolorized and reduced to a small volume. It is then cooled, dissolved in water and exactly neutralized with sodium hydroxide. The nitrogen will be contained in this product as ammonium sulphate, and may be determined gasometrically by means of sodium hypobromite, a known solution of ammonium sulphate being used for comparison. Or it may be boiled with normal solution of soda in sufficient quantity to displace the ammonium, which is entirely expelled by boiling the alkaline liquid for ten minutes. After this the product is treated with normal acid in excess, and titrated back to neutrality by normal alkali. The quantity of the latter required for the purpose is equivalent to the quantity necessary to displace the ammonia originally present in the fluid, and from this the quantity of nitrogen in the original substance can be calculated.—*Pharm. Journ.*, Oct. 31, 1903, 613; from *Bull. des Travaux de la Soc. de Pharm. Bordeaux*, through *Zeit. des Allgem. Oesterreich Apot. Ver.*, 1903, 552.

Nitrites—Delicate and Convenient Reagent.—W. A. Blunt finds that potassium ferrocyanide solution affords a delicate and convenient reagent for the presence of nitrites in drinking water, in addition to its well-known sensitive reaction with zinc in traces. With nitrites a urine-yellow tint is

produced, due to the oxidation of the ferrocyanide into ferricyanide. It might even be feasible to elaborate a colorimetric method for the determination of nitrites by taking advantage of this reaction. The same reagent, therefore, serves to test, in one operation, for the presence of zinc, iron and nitrites. It is pointed out that the reaction for zinc is more delicate in the presence of a trace of free hydrochloric acid.—*Pharm. Journ.*, Feb. 6, 1904, 148; from *Analyst*, 28, 313.



Nitrometer.

Nitrometer—Convenient Construction. E. Durien utilizes a champagne-top for the convenient construction of the nitrometer shown by Fig. 60, which needs little explanation. The tap is inserted into the closely-fitting stopper of a bottle

admitting a small test-tube for the reception of the liquid to be examined. The rubber tube connects the outer end of the tap with the graduated measuring tube, which, filled to the zero mark with brine by suction, is placed in an ordinary hydrometer-cylinder as shown. The reaction results when the liquid from the test-tube is allowed to flow into the reagent on slightly inclining the bottle below a horizontal position.—Pharm. Ztg., 48, No. 54 (July 8, 1903), 543; from Bull. Sc. Pharmacol., 1903, No. 5.

Nitric Acid—Comparative Value of the Ferrous Sulphate and Diphenylamine Test.—While conceding the greater sensitiveness of the diphenylamine test over the ferrous sulphate test for the presence of nitric in sulphuric acid, to which P. Schneider had recently called attention, Willy Wobbe maintains that the blue color produced by diphenylamine is by no means characteristic of nitric acid, the same color being developed under the influence of nitrous acid, chloric acid, bromic acid, iodic acid, and selenic acid, as well as a large number of compounds that readily part with oxygen, among which "ferric salts" should not be forgotten.—Apoth. Ztg., 18, No. 84 (Oct. 21, 1903), 738.

In a rejoinder to the above criticism of Wobbe, Dr. P. Schneider observes that, in so far as the test when applied to sulphuric acid is concerned, it is not so much a question of the presence of nitric acid, as of the *purity* of the sulphuric acid, and insists on the utility of the diphenylamine test, which should not give a trace of reaction in pure sulphuric acid, no matter what impurity may cause the development of the blue color.—*Ibid.*, (Oct. 28, 1903), 756.

Nitric Acid—Volumetric Estimation.—Débourdeaux has devised a volumetric method of estimating nitric acid, which is based on the action of that acid on oxalic acid, the quantity of oxalic acid destroyed being determined by an estimation with potassium permanganate. The method does away with a number of practical difficulties connected with the ordinary volumetric analysis of nitrates, and presents the following advantages: (1) A liquid scarcely alterable by contact with air is used; (2) a sulphuric medium remains which renders titrations very easy; (3) the use of carbonic dioxide is avoided; (4) the estimation is very rapid; (5) the results obtained have an accuracy within $\frac{1}{200}$ th of the whole.—Chem. News, July 31, 1903, 59; from Compt. rend., 86 (1903), No. 26.

ARGON.

Argon—Estimation in Atmospheric Air.—H. Moissan makes use of the property metallic calcium possesses of absorbing all the oxygen and nitrogen in a given volume of air, in order to estimate the argon in various samples of air. He finds that specimens obtained from the interior of continents at altitudes of 0 to 5800 metres contain from 0.932 to 0.935 per cent. by volume of argon, a remarkably constant proportion. Specimens from the surface of different seas contain quantities of argon which

in general vary more, and are slightly higher than those from inland parts. A single sample, taken over the Atlantic Ocean contained 0.9492 per cent. of argon.—Chem. News, Nov. 13, 1903, 242; from Compt. rend., 87 (1903), No. 16.

Argon—Determination in the Atmosphere.—H. Moissan employs the following method for the determination of argon in the atmosphere, which is based upon the fact that metallic calcium at a red heat absorbs both oxygen and nitrogen, as well as hydrogen. The air is passed, first over a mixture of quicklime and magnesium, then over small crystals of pure metallic calcium, both heated to redness. The residual argon is then measured. The amount present in the atmosphere is found to be remarkably constant. Air from the observatory on Mont Blanc gave 0.9352 per cent.; from Paris, 0.9337 per cent.; from London, 0.9325 per cent.; from Mont Pelée in Martinique, 0.9366 per cent. In fact, specimens of air taken at various altitudes from sea-level to a height of 5,800 metres, show a practically constant amount of argon. One sample only, taken from the Atlantic Ocean, gave 0.9492 per cent. of argon. These results confirm the statements of Dumas and Boussingault on the constancy of the constitution of the earth's atmosphere.—Pharm. Journ., Jan. 2, 1904, 4; from Comptes rend., 137, 600.

HALOGENS.

Halogen Salts—Determination in Admixture.—The following method for the determination of chlorides, iodides and bromides when present together is recommended by S. Benedict and J. F. Snell. The total halogens are first determined by any of the ordinary methods, gravimetric or volumetric. For the determination of the iodine a suitable quantity of the substance (containing not more than 0.5 Gm. of iodine or 0.15 Gm. of chlorine, if decinormal solutions are to be used) is dissolved in water and made up to about 50 Cc. Neutral potassium iodate is added in about twice the quantity necessary to react with all the bromine and iodine believed to be present. The mixed solution is acidified with 4 Cc. or 5 Cc. of acetic acid (30 per cent.) and shaken with 30-40 Cc. of carbon disulphide until all the liberated iodine has been taken up by the latter. The aqueous phase is now separated from the carbon disulphide phase, and the carbon disulphide is thoroughly washed with cold water. The washings and the aqueous portion are reserved for the chlorine determination. The carbon disulphide solution is transferred to another beaker, and is covered with 20 Cc. to 25 Cc. of alcohol (75 per cent.). The iodine is titrated with sodium thiosulphate, no starch indicator being necessary. For the determination of the chlorine the aqueous solution, previously separated, is treated with nitric acid to liberate bromine, and boiled until colorless. Excess of iodate is destroyed by adding a quantity of potassium iodide slightly in excess of the amount necessary to react with it.

The solution is again boiled until colorless, more nitric acid being added if necessary, and then cooled and neutralized with sodium carbonate. To secure exact neutralization the authors suggest that a little calcium carbonate may be added at first, and then sodium carbonate solution until a precipitate just forms. The chlorine may then be determined by titration with silver nitrate.—*Jour. Amer. Chem. Soc.*, 25, 1138.

Halogens—Influence on the Germination of Seeds.—M. E. Heckel has ascertained that the germination of seeds may be hastened by the action of chlorine, bromine or iodine. Camphor seeds which, when softened with water only, germinated in eight days, when heated with iodine water required only five days, with bromine water only three days, and with bromine water in which a little camphor had been dissolved only thirty-six hours.—*Pharm. Journ.*, Jan., 1904, 117; from *Rev. des Cult. Colon.*, 13, 285.

Chlorine—Density and Sources of Errors in Dumas' Method of its Determination.—H. Moissan and Binet du Jassoneix find that if the density of chlorine is taken by Dumas' method, when the chlorine is prepared under ordinary conditions, the density varies between 2.424 and 2.506. The principal causes of error in these determinations are: (1) The presence of air in the density bulb and in the current of chlorine, led through the apparatus; (2) the difficulty of completely drying the chlorine gas; (3) when liquid chlorine is used there is the difficulty of the solubility of different gases in this liquid. When all these sources of error are successfully eliminated, the authors find that at a temperature of 0° the chlorine extracted from sodium chloride has the density of 2.2490.—*Chem. News*, Jan. 29, 1904, 58; from *Compt. rend.*, 87 (1903), No. 26.

Chlorine—Methods of Preparation.—Dr. Bernh. Merk calls attention to the possible danger arising in the preparation of chlorine from either sodium or potassium chlorate and hydrochloric acid. Under certain conditions a brown-green gas is obtained, which may be driven over by gentle heat, containing chloric oxide and peroxide, which in a short time is resolved into its elementary components with violent explosion. A convenient and non-dangerous method is the well-known one depending on the reaction of chlorinated lime and hydrochloric acid.—*Pharm. Ztg.*, 48, No. 88 (Nov. 4, 1903), 894.

Chlorides—Detection in Presence of Bromides.—Chapman Jones proposes a method for the detection of chlorides in the presence of bromides, which is based upon the observation that if a cold saturated solution of ammonium bicarbonate is poured over silver chloride on a filter, the filtrate will give a distinct turbidity on acidification with nitric acid, while silver bromide, similarly treated, gives no turbidity. By allowing these silver salts to remain in contact with the ammonium bicarbonate for a few minutes with occasional agitation, the chloride will give a greater turbidity

on acidification, while the treatment of the bromide may be continued sometimes even for half an hour before it begins to give a positive result. But if the turbidity obtained on the acidification of a filtrate obtained under any of the above-mentioned conditions is in doubt, the identity may be established by adding a slight excess of the ammonium bicarbonate solution to it. If the turbidity is due to silver chloride, the solution will clear in a few seconds; if it is due to silver bromide, it will remain unaffected for several minutes, if not an hour or more. A blank experiment, for comparison, is made by adding water to another portion of the filtrate in the same proportion as reagent to the first portion. The ammonium bicarbonate should be fresh—ammonium sesqui-carbonate will not answer, since some of the silver bromide is liable to be dissolved by it.—*Chem. News*, May 13, 1904, 229.

Chlorine and Bromine—New Method of Estimation in Organic Bodies.—In a previous research, H. Bautigny and G. Chavanne investigated a method of estimation of iodine in organic compounds, based on the destruction of the substance by a chromosulphuric mixture and the transformation of the iodine into fixed iodic acid. It is evident that the same method of combustion can be applied to bodies containing chlorine and bromine, but the method fails when the oxidation of the chlorine or bromine is attempted. The authors, however, now describe an apparatus, which is shown in a drawing in "*Compt. rend.*" (88 [1904] No. 2), by which the quantitative estimation of the chlorine and bromine, after the deduction of organic matter, can be accurately determined.—*Chem. News*, Feb. 12, 1904, 82.

Bromine.—A reagent for cocaine (and possibly other alkaloids), suitable for toxicological determinations. See *Cocaine*, under "Organic Bases."

Iodine—Modern Source.—In an interesting description of the production of iodine from nitrate liquors, Dr. Wm. Newton observes that while iodine was originally extracted from the ash of sea-weeds, this industry is now almost moribund, and the little remaining trade could be killed at once if the Chili nitrate companies wished to do so. However, apparently it pays them better to keep up the wholesale price of iodine to 6d. per oz., which just allows a small profit to the last of the kelp extractors. The total amount of iodine produced has been, during the past three years, about 8,000 cwts. This includes a small amount from Scotland and France, but the bulk of it is extracted from the "mother liquors" of the nitrate works in Chili.—*Drug. Circ.*, 47, No. 8 (Aug., 1903), 161.

Iodine—Purification and Determination.—The method of iodine purification used by Stas in his researches on the atomic weight of iodine consists in dissolving iodine in a solution of potassium iodide, precipitating the iodine with water, drying over calcium nitrate, and subliming the

dried mass. A. Goss, as a result of experiments with this and other methods, concludes that the Stas method, above described, gives the purest iodine. He thinks, however, that sulphuric acid is the best drying agent, although the iodine is not contaminated when dried over calcium chloride. The iodine, when pure, may be satisfactorily determined by converting into zinc iodide and titrating with silver nitrate, potassium chromate being used as an indicator.—*Pharm. Journ.*, Oct. 17, 1903, 548; from *Journ. Amer. Chem. Soc.*, 25, 987.

Pure Iodine—Preparation.—L. W. Andrews recommends the following method for preparing pure iodine, which depends on the following reaction between previously fused and consequently perfectly dry potassium bichromate and potassium iodide: $5K_2Cr_2O_7 + 6KI = 8K_2CrO_4 + Cr_2O_3 + 6I$. The potassium iodide is pulverized with one and four-tenths times its weight of the potassium bichromate. Then introduce the thoroughly incorporated mixture into a wide tube, closed at one end, and heat to about 200° in a current of dry air to expel any moisture which may have been taken up during the pulverization. Place a plug of dry glass-wool over the mixture and wipe out carefully the interior of the tube above the plug with absorbent cotton secured to a glass rod. Slip over the open end of the tube a second, short one fitting it as snugly as possible. Fix the tube at an angle with the horizontal, and heat the powder gradually with a small flame, using, if necessary, a screen of asbestos board. Having sublimed the iodine into the upper part of the tube, cut off the latter when cold at a point 2 or 3 Cm. above the glass-wool plug. The author mentions that a nearly identical method has recently been published by L. L. de Koninck.—*Journ. Amer. Chem. Soc.*, 30, 428.

Iodine—Simple Method for its Detection in Metallic Compounds.—Prof. E. Riegler makes use of the property of hydrogen peroxide to liberate iodine from its metallic combinations for its detection by the following simple method: To about 10 Cc. of the liquid to be examined he adds about 5 Cgm. of barium peroxide, then 2 or 3 Cc. of chloroform, and finally 5 to 6 drops of concentrated hydrochloric acid. On shaking and subsidence, the chloroform layer will have a violet color if iodine is present. If more convenient, hydrogen peroxide may be substituted for the barium peroxide. The method is also applicable to the determination of iodine in urine; but here it is better to substitute starch paste, in about the same proportion, for the chloroform—iodine manifesting its presence by the blue color produced.—*Pharm. Centralh.*, 44, No. 35 (Aug. 27, 1903), 565.

Iodine—Separation as Cuprous Iodide from Mixtures of Haloid Salts.—According to H. Baubigny and P. Rivals, the simplest method of separating iodine from a mixture of chlorides, bromides, and alkaline iodides is to precipitate the iodine by the simple addition of $CuSO_4$, and this is really the most effectual if the operation takes place in presence of

excess of chlorides and bromides. In no case have the authors obtained an exact result by the method of evaporation *in vacuo* of the liquor and of free iodine, for in this method it seems that after the rough estimation of the iodine remaining in the dry product perfect exactitude is not possible, because when the dry product is dissolved in water, a process which leaves the insoluble Cu_2I_2 , a little iodine always goes into solution, and in the form of a cuprous salt, giving a less weight than should be obtained; for example, in a series of experiments on a silver salt, 0.068 Gm. AgI were obtained, instead of 0.069 Gm., and 0.2742 Gm. instead of 0.276 Gm.—Chem. News, Dec. 11, 1903, 293; from Compt. rend., 87 (1903), No. 19.

Iodide—Separation in Presence of Bromides and Chlorides.—Pure boric acid, according to H. Baubigny and P. Rivals, liberates iodine from its combinations in the cold, forming hydriodic acid, but it only sets free bromine or chlorine from hot saturated solutions. If a feeble oxidizing agent be present, the iodine is liberated as such, and may be titrated in the usual manner. Such a weak oxidizing agent is furnished by manganese dioxide, obtained by treating potassium permanganate with alcohol, collecting the precipitate and using it either in the pasty condition or dried at a low temperature between 30° to 40° C. A solution containing iodine, bromine and chlorine as salts, is introduced with an excess of this manganese dioxide and boric acid into a flask and attached to a receiver containing an alkaline solution of sodium sulphide, the latter salt being added to reduce any hypo-iodides formed. On warming the flask, the iodine is liberated and is drawn over in a current of air. The amount of iodide in the receiver may then be determined by titration. The authors have devised a special apparatus for conducting this method. The bromine may then be liberated in the residual liquid by means of cupric sulphate and potassium permanganate. After distilling off this, and determining the amount in the distillate, the chlorine in the residue may be estimated volumetrically in the usual manner.—Pharm. Journ., Jan. 30, 1904, 117; from Comp. rend., 137, 650.

Iodine—Probable Cause of the Different Colors of its Solutions.—It is a well-known fact that solutions of free iodine have different colors, depending in some way upon the nature of the solvent. Thus Gautier and Charpy, about twelve years ago, distinguished from sets of colors: *violet*, in chloroform; *red*, in ethylene bromide; *red-brown*, in toluene, and *brown*, in alcohol. A large number of solvents were thus classified, but these authors have been unable to find any relations between the chemical function of the solvent and the color; nor were Krüss and Thiele, a few years later, able to explain the different colors by the assumption of different molecular weights, *violet* solutions containing I_2 , *brown* solutions $(\text{I}_2)_n$, n being greater than one. Arthur Lachman has now investigated the subject in the belief that a simple causal connection exists between the chemical behavior of the solvent and the color of the iodine solution. This

relationship was not apparent to the previous investigators, *because in critical cases they observed wrong colors*, owing to impurities in the solvents. He has found that iodine solutions, when made with pure solvents, have but two colors—violet and brown—with but one exception. From the results tabulated, all of which have been verified personally by the author, the relationship between the color and the constitution of the solvent stands out clearly; *saturated solutions give violet, solvents which have unsaturated characters give brown solutions*. The *violet class* of solvents comprises hydrocarbons, their chlorides and bromides, and carbon bisulphide, and also, strange to say, the nitro-compounds. The *brown class* of solvents embrace all the other oxygen compounds, so far as has been investigated—alcohols, ether, ketones, acids and esters, nitrites and nitrite bases, alkyl and other iodides, and bivalent sulphur compounds. The iodine molecule, as found in iodine vapor, is violet, and there is every reason for assuming that in its violet solution iodine is in a state of normal physical distribution. On the other hand, certain of the brown solutions are known to contain periodides, and in the light of the recent investigations of Baeyer and Villiger, which have demonstrated the hitherto unsuspected addition powers of combined oxygen atoms, it seems justifiable to assume in all brown iodine solutions the existence of certain (probably unstable) addition compounds. The actual isolation of the addition products of iodine with oxygen compounds will probably be difficult, but an effort in this direction will be made by the author.—Chem. News, Dec. 24, 1903, 308; from Journ. Amer. Chem. Soc., XXV., No. 1.

Crystalline Fluorides—New Method of Preparation.—Defaço finds that the transformation of manganese fluoride into calcium fluoride is total if the quantity of manganese chloride is very small in proportion to the calcium chloride. Fluoride of calcium is formed, and as the reaction continues the manganese fluoride is entirely transformed into manganese chloride, thus: $\text{MnF}_2 + 2\text{CaCl}_2 = \text{CaF}_2\text{CaCl}_2 + \text{MnCl}_2$. This reaction is general. It has been effected not only with the chloride, but also with the bromide and iodide of calcium, and with the three salts of strontium and barium. The method allows of the preparation of fluochlorides, fluobromides, and fluoiodides of the alkaline-earth metals.—Chem. News, Jan. 29, 1904, 59; from Compt. rend., 87 (1903), No. 26.

Fluochlorides, Fluobromides, and Fluoiodides of the Alkaline-Earth Metals—Conditions of Formation.—Ed. Defaço shows that when a mixture of manganous fluoride is treated at temperatures between 800° and 1400° with chloride, bromide, and iodide of an alkaline-earth, the alkaline-earth fluoride results, together with the chloride, bromide, and iodide of manganese, the quantity of the latter increasing in proportion as the quantity of manganese fluoride is increased. He also shows that manganese chloride, bromide, and iodide react in the same way on alkaline-earth fluorides. It follows, therefore, that, in the fused liquid, an equilibrium

must be produced for the two reversible reactions. The transformation of manganous fluoride into an alkaline-earth fluoride is only total when the quantity of chloride, bromide, or iodide of manganese, as compared with the alkaline-earth chloride, bromide, or iodide, is very small; the fluochlorides, fluobromides, and fluoiodides cannot then be formed, since they are destroyed by the chloride, etc., during fusion. Alkaline-earth fluorides are formed when the manganous fluoride is mixed with a large excess of alkaline-earth chloride, bromide, or iodide. Fluochlorides, fluobromides, and fluoiodides of the alkaline earths are also formed when the alkaline-earth halides are entirely transformed into manganous chloride, bromide, or iodide by employing the theoretical quantities demanded by the equation $MnF_2 + 2XY = XF_2 \cdot XY + MnY_2$; X representing Ba, Sr, or Ca; Y representing Cl, Br, or I.—Chem. News, Feb. 26, 1904, 106; from Compt. rend., 88 (1904), No. 4.

Fluorine—Density.—Since the discovery that fluorine, when absolutely free from hydrofluoric acid, does not act on dry glass, a series of new determinations of its density have been made by Henri Moissan, by filling a glass bulb with the gas and weighing. The author describes the various precautions necessary for these determinations. Four experiments gave respectively the numbers, 1.298, 1.319, 1.313 and 1.312; the mean is 1.31. The theoretical density, taking 19.05 as the atomic weight of fluorine, should be $0.06927 \times 19.05 = 1.319$. The two numbers so obtained are almost identical, and 1.31 can, therefore, be admitted as the experimental density of fluorine.—Chem. News, April 22, 1904, 202; from Compt. rend., 88 (1904), No. 12.

Calcium Fluoride—Preparation and Character of Crystals.—Defacoz finds that calcium fluoride may be conveniently obtained in a crystalline condition by the double decomposition of manganese fluoride and calcium chloride, either in a porcelain crucible heated in the blowpipe, a current of carbonic acid gas being passed during the process through the perforated lid by means of a porcelain tube; or by placing the mixed salts in a platinum crucible; these two being again enclosed in a fireclay crucible, which is heated in a charcoal brazier to between 800° to 1,400° C. The best results were obtained when 1 part of manganese fluoride and 5 parts of calcium chloride were employed. The fused mass was allowed to cool slowly, and then extracted with alcohol 95 per cent., which dissolves both the manganese chloride and the excess of calcium chloride. Calcium fluoride is thus obtained as a white or yellowish product with a crystalline aspect. Microscopic examination shows it to consist of a mixture of octahedra and another crystalline substance, the form of which has not yet been identified.—Pharm. Journ., April 2, 1904, 466; from Compt. rend., 137, 1251.

SULPHUR.

Sulphur—Slow Combustion in Oxygen and in Air.—Having found that carbon undergoes slow combustion in oxygen and air, H. Moissan has directed his attention to sulphur, and finds that the metalloid also combines slowly with oxygen considerably below its temperature of inflammation. This temperature is found to be 282° C. in oxygen, and 363° C. in air, at normal atmospheric pressure. At 100° C. the slow combustion of sulphur produces sufficient sulphurous acid gas to allow it to be congealed at -186° C., and identified. Even at ordinary temperatures the combination takes place, but more slowly, affording sufficient SO_2 to allow that gas to be identified. In this respect the behavior of sulphur is precisely analogous to that of carbon, and occurs with all the allotropic forms of the element.—Pharm. Journ., Dec. 12, 1903, 877; from Compt. rend., 137, 547.

Hydrogen Sulphide—Purification for Arsenic Determinations.—To precipitate arsenic from its acid solutions in the state of sulphide, Selmi used hydrogen sulphide produced by the decomposition of the alkaline or alkaline-earthly sulphides by hydrochloric acid. Armand Gautier, however, has found it practicable to purify ordinary hydrogen sulphide, notwithstanding that this always contains arsenic, and the ordinary methods of washing, etc., do not remove this element completely; but its complete purification may be effected as follows: The hydrogen sulphide gas, after washing with water, is passed through a vertical column of 30 Cm. of moist pumice-stone, then through a combustion tube filled with fragments of glass and heated to dull redness for a distance of 25 Cm. The gas is then passed through a serpentine bulb-tube filled with a concentrated solution of barium sulphide, where it again deposits traces of arsenical compounds. Finally, it is passed through a tube packed with cotton-wool before arriving at the liquor in which it is to react. Thus purified, this gas, after a passage, bubble by bubble, through boiling nitric acid, which oxidizes the whole, gave a total amount of arsenic of 0.0008 Mgm. Not a trace could be found when 300 to 400 Cc. of this gas were passed through acidulated water. The same quantity of hydrogen sulphide that yields 0.0008 Mgm. of arsenic when purified by the proposed method, will yield 0.08 Mgm. if it is purified by simple washing with water and acid in the usual manner.—Chem. News, Oct. 30, 1903, 213; from Bull. Soc. Chim. (3), xxiv, No. 16.

Hydrogen Sulphide—Influence of Concentration of Acid and of Temperature on its Evolution.—Operating during a winter day in a Kipp's apparatus for the generation of hydrogen, with ferrous sulphide and commercial hydrochloric acid, Sartorius failed to secure an evolution of H_2S . Investigation of this phenomenon placed the responsibility on the high concentration of the acid and the low temperature at which the attempt

to produce H_2S was made. On dilution of the acid, and conducting the operation at a moderate temperature, the evolution of gas was satisfactory. The author records experiments which describe the reaction resulting with acids of different strengths and at different temperatures, these results leading him to recommend the dilution of the concentrated hydrochloric acid with an equal quantity of water and to operate at the ordinary room temperature.—*Apoth. Ztg.*, 19, No. 2 (Jan. 6, 1904), 14.

Sulphur Bromide—Incidental Formation and Reactions.—Having frequent occasion to prepare hydrobromic acid by the method of A. Naumann, which depends upon the action of H_2S on bromine in the presence of water, George Korndörfer observed that in the presence of water in abundance the reaction takes place smoothly in accordance with the equation— $H_2S + 2Br = 2HBr + S$. If, however, the quantity of water is small in proportion to the quantity of bromine, the reaction becomes complicated by the formation of sulphur bromide, which separates in form of a red oily liquid of very high sp. gr. Having obtained a quantity of this bromide, and established its identity as sulphur bromide, the author takes advantage of the opportunity to determine some of its reactions. He finds that its reaction with *cold* water is very sluggish. The sulphur bromide sinks in it, and the water gradually becomes turbid from separation of sulphur. By *warm* water, however, the bromide is rapidly decomposed, resulting, according to Michaelis, in the formation of sulphurous acid and deposition of sulphur; according to Harms, into hydrobromic acid, sulphuric acid and hydrogen sulphide. The reaction of sulphur bromide with dilute potassa solution and with sodium bicarbonate is apparently a smooth one. Practically, however, it is found that it is not quite so, a portion of the bromide escaping decomposition—probably owing to the smeary form in which the sulphur is deposited. The decomposition by sodium bicarbonate results substantially according to the equation— $2S_2Br_2 + 6NaHCO_3 = 4NaBr + Na_2SO_3 + 4CO_2 + 3S + 2H_2O$. It seems probable that a trifling quantity of polythionic acid is also formed during the reaction.—*Arch. d. Pharm.*, No. 2 (March 5, 1904), 156–160.

Sulphur Iodide—Improved Methods of Preparation.—F. H. Alcock calls attention to some preliminary experiments undertaken with the object of avoiding the breaking of the flask in which, according to the B. P. process, the combination of the sulphur and iodine is affected—the necessary breakage of the flask resulting in a contamination of the product with splinters of the glass. In the experiment 60 grains of iodine and 15 grains of sublimed sulphur were intimately mixed in a glass mortar, transferred to a test-tube, heated to melting, and the tube rotated so as to produce a thin layer of the iodide on its sides. On adding half a fluid ounce of carbon disulphide, the greater part of the iodide was dissolved, forming a permanganate-colored solution, and 2 fluid drachms more of the CS_2 readily removed the granular residue completely into a dish, in which the CO_2 was

blown off. After thus standing over night the product had lost 9 grains from its original weight, had a granular crystalline form, and responded to the official tests.—Pharm. Journ., Sept. 26, 1903, 460.

Hyposulphurous Acid—Conditions of Production and Stability.—According to J. Aloy, hyposulphurous acid can be rapidly produced by the action of an alcoholic solution of sulphurous acid gas on sulphur. The presence of alcohol and of neutral salts increases the stability of hyposulphurous acid, whilst the presence of acids and the action of solar light aids its decomposition. The mode of decomposition of the acid depends on the proportion of sulphurous acid existing in the solution.—Chem. News, Aug. 7, 1903, 70; from Compt. rend., 87 (1903), No. 1.

Sodium Thiosulphate—Decomposition by Heat.—Arthur Jaques finds that when crystallized sodium thiosulphate is quickly heated in a test-tube it is decomposed near the hot wall of the tube while water is still being given off from the mass, hydrogen sulphide being given off in considerable quantity. It is evident that the hydrogen of the SH_2 can only have come from the water, so that the nascent sulphur, together with the reducing influence of the sodium sulphite formed in the decomposition, has been sufficient to break up the water at the temperature of the mixture.—Chem. News, Dec. 18, 1903.

Sulphur and Selenium—Character of Crystals Formed in Melted Mixtures.—W. E. Ringer has investigated the products of melted mixtures of sulphur and selenium. He finds that sulphur and selenium in the purer state are miscible in all proportions, but that the melted mass containing a proportion of selenium greater than 10 atoms per cent. crystallizes with difficulty. On cooling very slowly an amorphous mass is produced. By heating them for several hours to very near their fusing-point, mixtures rich in selenium become completely crystalline. From an examination of their fusion curves, it results that all these crystalline mixtures consist of mixed crystals of sulphur and selenium; nothing points towards the formation of a double combination. These melted mixtures form three series of crystals: 1. A series of monoclinic crystals containing from 0 to 27 atoms per cent. of selenium, and of the same type of crystal as monoclinic sulphur. 2. A series of monoclinic crystals containing 50 to 82 atoms per cent. of selenium (of the same type as the third modification of sulphur?). 3. A series of crystals formed of hexagonal rhombohedra of the type of metallic selenium, containing 87 to 100 atoms per cent. At a temperature comprised between 75 and 95.5°C., the crystals of the first series are transformed into orthorhombic crystals; the transformation is comparable to that of monoclinic sulphur into the orthorhombic variety. The crystals belonging to the two other series do not undergo any analogous change. At the ordinary temperature we obtain: 1. A series of rhombic crystals containing from 0 to 10 atoms per cent. of selenium. 2. A series of crystals containing from 55 to 76 atoms per cent. of selenium. 3. A

series of crystals of the type of hexagonal selenium containing 90 to 100 atoms per cent. of selenium.—Chem. News, Mar. 11, 1904, 131; from Zeit. Anorg. Chem., xxxii., 183.

Colloidal Selenium—Characters of Its Aqueous Solutions.—A. Gutbier has investigated the characters of colloidal selenium in solutions. Such solutions, which were obtained for the first time by Schulze, are obtained by treating solutions of selenious acid with hydrate of hydrazine (1 part in 2,000), hydrochloride of hydroxylamine, or hypophosphorous acid. The solutions are red by transmitted light and a fluorescent blue by reflected light. They can be concentrated and filtered without changing; when submitted to electrolysis they deposit red selenium. By prolonged concentration of the solutions *in vacuo* over sulphuric acid, soluble colloidal selenium (hydrosal) is deposited, but more often the major portion is transformed into the insoluble colloidal selenium (hydrogel).—Chem. News, March 18, 1904, 143; from Zeit. Anorg. Chem., xxxii., 106.

Colloidal Sulphides of Selenium and Tellurium—Investigation of Characters.—A. Gutbier communicates the results of an examination into the characters of the colloidal sulphides of tellurium (TeS_2 and TeS_4) and of selenium. The colloidal solution of the

Tellurium Sulphide, TeS_2 , is obtained by the action of very small quantities of hydrogen sulphide on aqueous solutions of tetravalent tellurium. The blackish-brown or reddish-brown solution is easily dialyzed; if the solution is concentrated it easily deposits sulphide of tellurium. On cooling the colloidal solution considerably, the colloid is deposited in the soluble form in reddish-brown flocculent masses. The colloidal solution of the

Tellurium Sulphide, TeS_4 , is obtained by passing a small quantity of hydrogen sulphide through an aqueous solution of TeO_2 . The colloidal solution is entirely analogous to that of TeS_2 . By transmitted light the solution appears to be limpid; by reflected light it appears grey and cloudy. The colloidal solution of

Selenium Sulphide, is a yellow liquid with a green fluorescence; the color resembles that of uranium glass. The solution can be filtered without decomposition, and only coagulates very slowly even on the addition of electrolytes.—Chem. News, Jan. 29, 1904, 59; from Ztschr. Anorg. Chem., xxxii., 292.

PHOSPHORUS.

Phosphorus—Quantitative Estimation in Phosphorated Oils, etc.—After reviewing the difficulties encountered in the quantitative phosphorus estimations in phosphorated oils, J. Katz suggests the following modification of Straub's method and gives analytical and experimental data confirming the efficiency of the modified process: 10.0 Gm. of the phosphorated oil

are vigorously shaken in a separating funnel with 20 Cc. of a 5 per cent. cupric nitrate solution, until the formation of a permanent black emulsion results; 50 Cc. of ether are then added, and the mixture is shaken with 10 Cc. of hydrogen dioxide, added in small portions at a time, or so much as may be necessary, until the black coloration disappears completely. The aqueous fluid is then separated, the residual ether layer is shaken three times with 10 to 20 Cc. of water, and the aqueous liquid and washings, after acidulation with a few drops of HCl, is evaporated on the water-bath to 10 or 20 Cc. After removal of any oily globules that may be present by filtration, the filtrate is treated with ammonia solution until the precipitate at first produced is redissolved, and the phosphoric acid (produced by the action of the hydrogen dioxide on the elementary phosphorus in the copper phosphide) is then determined in the well-known manner with magnesia mixture. It is necessary, of course, to determine the absence of phosphoric acid in the hydrogen dioxide used, the latter being sometimes preserved by the addition of phosphoric acid.—Arch. d. Pharm., 442, No. 2 (March 5, 1904), 121-138.

Pure Hypophosphorous Acid—Preparation and Properties.—C. Marie describes a method for preparing hypophosphorous acid by modification of Thomsen's process, and purifying the product by fractional crystallization. On cold days the crystals can be collected by the aid of the filter pump, and they are then left to dry for several days over phosphoric anhydride. Careful experiments show the pure acid thus obtained to have the melting-point 26.5°C . It is decomposed by heat according to the following equation: $2\text{PO}_2\text{H}_3 = \text{PO}_2\text{H}_3 + \text{PH}_3$.—Chem. News, June 17, 1904, 297; from Compt. rend., 88 (May 16, 1904), No. 20.

Pure Iodine—Preparation for Volumetric Estimations.—L. de Koninck reviews the different known methods for procuring iodine for the preparation of titrated solutions. He recommends the action, by the dry way, of bichromate of potassium on iodide of potassium, feeling assured that the impurities usually contained in those two salts are generally without influence on the final product; further, it is very easy to purify these salts. The iodine is prepared by this method, by heating a very intimate mixture of one part of iodide with three-fourths of bichromate. By collecting the iodine in a tared matrass or glass bulb, it is possible to prepare a titrated solution directly and rapidly.—Chem. News, June 24, 1904, 311; from Bull. Assoc. Belge Chim., xvii., 15.

BORON.

Fused Boric Anhydride—Action on Metallic Oxides.—C. H. Burgess and A. Holt, Jr., have investigated the action of fused boric anhydride on many metallic oxides, and find that only a limited number dissolve. Lithium, sodium, potassium, caesium and rubidium, as carbonates, readily dissolve in boric anhydride in all proportions up to saturation, giving clear

glasses, and thallium behaves in the same way. With a very large amount of alkali, however, the glass becomes opaque. Calcium, strontium, barium, zinc, cadmium, magnesium, manganese, lead and bismuth oxides are insoluble in small quantities, but, on gradually increasing the amount, dissolve to clear glasses; with a further addition of oxide, the mass again becomes opaque, except in the cases of lead and bismuth, which yield pale yellow, very fusible glasses. The oxide of mercury appears to be soluble, and those of antimony and arsenic slightly so. The oxides of aluminum, beryllium, tin, cerium, thorium, niobium and silicon are all quite insoluble. The oxides which color the borax bead, namely those of chromium, copper, molybdenum, uranium, iron, nickel and cobalt, are all insoluble in the fused anhydride, the manganese oxides in this respect behaving exceptionally. The last series of oxides can, however, be dissolved in boric anhydride containing lithium, potassium, caesium, rubidium and thallium, and the clear glasses obtained with larger amounts of the colored oxides were similar to the borax beads, although the colors were sometimes modified.—Pharm. Journ., Dec. 5, 1903, 841; from Proc. Chem. Soc., 19, 221.

Boric Acid—Action on Halogen Salts.—H. Baubigny and P. Rivals find that pure boric acid liberates hydriodic acid from iodide solutions in the cold, while it only decomposes hot, saturated solutions of bromides and chlorides. These facts are applied to the separation of iodine from a mixture of halogen salts as follows: 100 Cc. of the salt solution is heated with 10 Gm. of boric acid and 0.2 to 0.4 Gm. of the paste (" $\text{Mn}_2\text{O}_4\cdot\text{H}_2\text{O}$ ") formed by reducing a solution of a permanganate with alcohol, washing the precipitate and drying at 30° – 40° C. The iodine is collected in a solution of alkali, containing a small quantity of sodium sulphite (to decompose any hypoiodite present), and the iodine estimated as silver iodide.—Pharm. Journ., December 12, 1903, 877; from Compt. rend., 137, 650.

Boric Acid—Estimation in Foods.—J. Prescher critically reviews the different methods that have been proposed for the estimation of boric acid in foods, a problem which presents great difficulties on account of the impossibility to precipitate the acid quantitatively from its aqueous solutions. Referring those interested to the author's very exhaustive paper, it may be mentioned here that he considers only the methods of Joergensen, of Partheil, and of Hebebrand as being suitable for such examination, giving preference to the method of Joergensen, because no special apparatus is required, such, for example, as is necessary by the shaking-out method of Partheil-Rose. In forensic cases, however, the latter has the advantage that the boric acid found can always be submitted as such in cases of controversy, while this is not possible in the others. Hebebrand's colorimetric method is original, but not likely to become popular, because an abundant experience is demanded to determine colorimetrically the same quantities determined by chemical analytical methods. Gooch's method, which

yields extraordinarily accurate results in scientific determinations, is too circumstantial for the examination of foods, and the same is true of a method worked out by the author, which depends on the estimation of boric acid as a borophosphate.—Arch. d. Pharm., 242, No. 3 (April 8, 1904), 194-210.

Boric Acid—Rapid Determination in Borax.—K. Jacobi has found that if glycerin is added to a solution of borax the solution becomes acid towards phenolphthalein, and on titration the neutral point corresponds with the formation of a meta-borate, $\text{Na}_2\text{B}_3\text{O}_6$. In practical effect the reaction is $\text{Na}_2\text{B}_4\text{O}_7 + 2\text{NaOH} = 2\text{Na}_2\text{B}_3\text{O}_6 + \text{H}_2\text{O}$. The method is as follows: Dissolve 2 to 4 Gm. of borax in water, add excess of glycerin, a few drops of phenolphthalein, and titrate with semi-normal sodium hydroxide. Deduct the correction for the glycerin from the number of Cc. used and multiply by 0.0175. The product must be doubled to give the amount of boric acid present. Carbonates interfere with the end-reaction.—Journ. Amer. Chem. Soc., 26 (1904, 91).

Borax—Commercial Quality.—A. R. L. Dohme procured samples of borax from a retail druggist, cut-rate store, grocers and a department store. The only sample that could be considered pure borax was that from the "cut-rate" drug store. That from the "retail druggist" was 98 per cent. pure; that from a "grocer," 96 per cent. pure; while the sample from a "grocery store" contained 55 per cent., and that from the "department store" contained about 80 per cent. of sodium bicarbonate. It is explained that the article obtained from the "grocery store" was put up and supplied by a jobber under a fictitious name.—Proc. Md. Pharm. Assoc., 1903, 71-72.

Borax—Use for Standardizing Volumetric Hydrochloric Acid.—Dr. Richard Witte recommends borax for determining the titer of volumetric hydrochloric acid, being led to adopt this on account of the stability of its solution and the sharpness of the reactions involved in the process of standardization. Pure borax, obtained by crystallization is reduced to an air-dry powder, pressed between blotting paper, and 38.2 Gm. of this powder dissolved in sufficient water to make 1000 Cc, this forming a solution requiring exactly $\frac{1}{5}$ of its volume of normal hydrochloric acid for saturation. To establish the titer of the latter, therefore, 50 Cc. of the borax solution measured with a pipette, a few drops of dimethyl-amidoazobenzol solution added, and the hydrochloric acid is allowed to flow in from a burette until the pale yellow of the mixture just changes to pink. The amount of acid so required, multiplied by 100, gives the quantity necessary to make 1 liter of normal hydrochloric acid. The method is so simple and accurate that it has now been adopted in many laboratories, and is warmly recommended by the author.—Apoth. Ztg., 18, No. 52 (July 1, 1903), 450.

SILICON.

Silicides of Chromium—Production of Four Compounds.—By a method consisting in reacting on a mixture of copper and chromium, with variable proportions of silicon in the form of silicized copper, free silicon, or of nascent silicon resulting from the action of sodium on an alkaline fluosilicate, P. Lebeau and J. Piguera have succeeded in isolating the following four silicides: SiCr_3 , SiCr_2 , Si_2Cr_3 , and Si_4Cr . Of these, only the silicide Si_2Cr_3 is entirely new. It crystallizes in long, quadrangular prisms, rarely terminated. Its density at 0° is 5.6. It scratches glass, but will not mark quartz.—Chem. News, Oct. 30, 1903, 213; from Bull. Soc. Chim. (3), xxix, No. 15.

Ruthenium Silicide—Preparation and Properties.—By fusing together silicon and ruthenium, or a mixture of silicon, ruthenium and copper, in a charcoal crucible in a tube of the same material, H. Moissan and W. Manchot have obtained ruthenium silicide, RuSi . When the fused button is broken up and purified by treatment with caustic soda solution on the water-bath, and subsequently with a mixture of hydrofluoric and nitric acids, the residue consists of brilliant crystals of this silicide mixed with carborundum. From this it is separable, in consequence of the differing density of the two bodies, by immersion in methylene iodide. The crystals of RuSi thus obtained consist of dendritic prisms terminated by pyramids, white in color, with a metallic aspect. When slightly oxidized, as sometimes occurs, the crystals are of a darker tint. They may then be restored to their normal brilliancy by momentary contact with melted potassium hydrofluoride. They have the specific gravity 5.40 at 4°C ., are very hard, easily scratching rock, crystal, topaz, and ruby, but the powder is without abrading action on the surface of polished diamond. RuSi is volatile in the electric furnace. It is very stable, but is attacked with incandescence by fluorine in the cold; chlorine attacks it slowly and superficially at 500°C .; at a red heat, however, combination takes place with disengagement of heat, but is not complete even at high temperatures. It burns with a fine flame when suddenly heated in oxygen. Fused potassium chlorate and other oxidizing agents attack it slowly without incandescence. The vapor of sulphur decomposes it at a dull red heat, at which temperature it is also slowly attacked by metallic sodium and by magnesium. It is unaffected by most acids at their respective boiling points; a mixture of nitric and hydrofluoric acids is without action on it in the cold, and only reacts very slowly on warming. Fused caustic potash and its carbonate barely affect RuSi , but a mixture of potassium bisulphate and nitrate in fusion gradually oxidizes it into per-ruthenate. Although potassium hypochlorite readily attacks metallic ruthenium it is without action on ruthenium silicide.—Pharm. Journ., Nov. 21, 1903, 786; from Comp. rend., 137, 229.

Silicates—Advantageous Use of Formic Acid for Liberating Silica.—

A. Leclère finds that formic acid is far preferable to nitric or any other acid for liberating silica in the course of analysis. After fusion with alkali to render the silicate attackable by acid, the fused acid is treated with boiling water and sufficient formic acid to make, finally, about 5 per cent. of free acid in excess. Silica and titanitic acid are at once precipitated, without first assuming the gelatinous condition, and may be readily filtered off. From the filtrate, iron and alumina may then be precipitated by neutralizing the free acid and boiling, the precipitate being easily collected and washed. It thus becomes possible, by the use of formic acid, to determine both the silica and the base without the use of any other reagent.—*Pharm. Journ.*, August 15, 1903, 269; from *Compt. rend.*, 137, 50.

Sodium Silicate—Test of the Ph. G. IV. for Free Alkali.—The Ph. G. requires that the official sodium silicate shall be free from compounds deficient in silica and completely free from free alkali, these conditions being ascertained by the granular (not smeary) condition of the precipitate formed on mixing equal parts of the silicate solution and alcohol, and the neutrality of the filtrate to red litmus. It has been found, however, by others, and now again by J. D. Riedel, that this condition of neutrality cannot be attained in practice, and that the filtrate, though obtained from a granular principle, will almost invariably give a faint bluish reaction with red litmus. On the other hand, it is found to be absolutely indifferent to curcuma paper, and it is therefore evident that the bluing effect is due to something other than *free* alkalies. Schlickum, in his "Kommentar," attributes this reaction to the presence of small quantities of bisilicate, and Riedel is inclined to hold the same opinion, and that this impurity is unavoidable in the preparation of the compound.—*Pharm. Ztg.*, 49, No. 3 (Jan. 9, 1904), 26.

Soapstone—Production of Fibres.—K. E. Guthrie has shown experimentally that fused steatite or soapstone can be used as a substitute for fused quartz in the production of fibres of very small elastic fatigue suitable for suspensions. The soapstone can be melted in a gas-oxygen jet, and very fine fibres are easily drawn out from the clear bead thus obtained. The elastic fatigue and tensile strength of these fused steatite fibres have approximately the same value as fused quartz fibres of the same dimensions.—*Pharm. Journ.*, June 25, 1904, 852; from *Physical Review*, through *Nature*, 70, 132.

CARBON.

Volatilized Carbon—Nature.—Berthelot finds that the carbon volatilized from the incandescent filament in the ordinary electric lamp is in the amorphous condition, and contains neither graphite nor diamond crystals. Similarly, the residual filament consists entirely of amorphous car-

bon, free from graphite. If, however, a higher temperature be employed, as in the arc light, graphite is formed. It follows that carbon possesses an appreciable vapor tension at a temperature below a white heat, probably about $1,200^{\circ}\text{C}$. and $1,500^{\circ}\text{C}$. This vapor tension is so slight that it requires several hours to form any condensed carbon even in the almost perfect vacuum of the electric lamp. The temperature at which this vapor tension is evident is, therefore, some $2,000^{\circ}\text{C}$. below the boiling point of the element, a much greater interval than has been recorded for any other substance. The author does not consider the volatilization of carbon to be a simple process, similar to that of other bodies, but to be due to a much more profound physical change; since although carbon, as such, is a simple chemical element, it occurs in many polymeric forms corresponding to the numerous series of combinations which it is capable of forming. Volatilization is not the result of an immediate formation of normal carbon, but a process of progressive condensation.—Pharm. Journ., Dec. 12, 1903, 877; from Comp. rend., 137, 589.

Diamonds—Artificial Production.—Combes discusses the various attempts which have been made to obtain the diamond artificially. Against the common supposition that the diamond can only be produced at high temperatures, the author cites several observations which seem to indicate that natural diamonds, at any rate, cannot have been formed under such conditions. The hypothesis that high pressures are necessary for the artificial production of diamonds is not in accord with actual experimental facts, and the author arrives at the conclusion that in the experiments of Moissan the pressure plays no essential part, and that the optical properties and the analysis of the crystals obtained by this chemist do not warrant the conclusion that these are to be regarded as diamonds.—Pharm. Journ., Dec. 19, 1903, 908; from Moniteur Scient., through Nature, 69, 113.

Calcium Carbide—New Method of Preparation. In all former experiments Henry Moissan had found that carbon only reduces lime at a very high temperature, when the latter substance has just attained the liquid state. This condition necessitates the use of the electric furnace for the commercial preparation of the carbide. He now, however, finds that metallic calcium combines with lamp-black at a dull red heat to form pure calcium carbide, crystalline and transparent, and he is now engaged in experimenting on the most convenient method of producing the metallic calcium, required in this preparation, by the electrolysis of calcium chloride or of a mixture of chloride and fluoride of calcium.—Chem. News, April 15, 1904, 191; from Compt. rend., 88 (1904), No. 11.

Calcium Carbide—Formation at Comparatively Low Temperature.—The combination of lime and carbon, as performed at present in the commercial production of calcium carbide requires a very high temperature.

H. Moissan finds, however, that whenever a salt of calcium is submitted to electrolysis in contact with carbon, a small amount of calcium carbide is formed below a red heat. Although calcium chloride, in a state of fusion in a graphite crucible, when decomposed by an electric current from a negative carbon electrode gives a notable amount of carbide, better results are obtained by operating with a mixture of calcium chloride and fluoride, since the fused mass is more fluid. A small quantity of coarsely-powdered petroleum coke is stirred into the fluid, and the current reversed. After passing the current for some time, and cooling the mass, the portion nearest the sides of the crucible is found to yield from 64 to 65 per cent. of acetylene when brought into contact with water. This reaction takes place at about 500° C. The yield of carbide is, however, too small, and it is too impure, being distributed through the mass of fused calcium chloride and fluoride, to form a practicable source of that body on the commercial scale.—Pharm. Journ., May 7, 1904, 617; from Comp. rend., 138, 661.

Double Carbide of Chromium and Tungsten—Properties, Composition, etc.—Employing different processes, Henry Moissan and A. Kousnetzow have prepared the double carbide of chromium and tungsten, having the formula $K_2C_3Cr_3C_2$. Its density is 8.42. It is very stable, is not attacked by acids and the principal reagents, and is remarkable for its extreme hardness—the latter fact leading the authors to the conclusion that the addition of tungsten to chromated steel may possibly cause the formation of this compound and at the same time produce new and special properties in the steels.—Chem. News, Sept. 11, 1903, 138; from Compt. rend., 87 (1903), No. 5.

Carbon Tetrachloride—Technical Uses.—In reply to a query concerning the uses of carbon tetrachloride or tetrachlor-methane, which was brought into prominence in the city of New York as a substitute for benzin for cleaning purposes when the fire department of that city interdicted the sale of the latter, the "Druggists' Circular" (Dec., 1903, 259), says: Its solvent qualities make it valuable in plant analysis, where alkaloids are to be removed. It can be used for filling fire grenades, and will be found to act better in extinguishing small fires than the solution of various salts usually employed for this purpose. It is even better than carbonated water. Its heavy, non-inflammable vapor forces the oxygen away from the burning articles and so subdues the combustion. It is very sparingly soluble in water but dissolves readily in ether, chloroform, oils, benzin, and other such liquids. When pure it has a pungent, aromatic odor, but much of that sold contains enough carbon disulphide to give it the disagreeable odor of this substance. The presence of the disulphide is due to its method of manufacture and imperfect purification. It was first made by Regnault by exposing a mixture of chlorine and chloroform to sunlight. At a later date Dumas made it by similar exposure of a mixture of marsh gas and chlorine. It is made commercially from a mixture of carbon di-

sulphide and chlorine by passing them through a red-hot tube and purifying the product by fractional distillation. It is also made by warming a mixture of carbon disulphide, sulphur chloride and finely divided iron ore or a metallic chloride, and then purifying.

Carbon Monosulphide—Questionable Existence.—Within recent years a number of attempts have been made to prepare carbon monoxide, but without success. Last year, however, Julius Thomsen, by passing a mixture of carbon disulphide and nitrogen over copper heated to dull redness, observed an increase in volume and obtained a gas which, as only nitrogen carbon disulphide and copper disulphide were originally present, he concluded was probably carbon monosulphide—a conclusion which was strengthened by other experiments. Since then Norman Smith has repeated the experiments described in Thomsen's paper, and finds that the results obtained by the latter can be entirely explained without assuming the formation of carbon monosulphide. Smith's experiments show very satisfactorily that under the conditions described by Thomsen, as well as under the conditions of other methods tried, the resulting gas instead of carbon mono-sulphide contained some carbon dioxide, and carbon monoxide—the carbon dioxide being probably derived from the copper, in which it was shown by Stock and Küchler to be invariably present. Independently, the last-named chemists have also repeated Thomsen's experiments, and their conclusions are confirmed by the results obtained by Smith.—Chem. News, Jan. 15, 1904, 25.

Sulphide of Carbon—Purification and Contents.—Sulphide of carbon is purified by V. Unruh by treating 500 to 700 Cc. with 6 to 8 Cc. of pure dry mercury and porous CaCl_2 . Shake, filter, and distil in the dark. This operation is repeated until no more sulphide of mercury is formed. The first portions (15 to 20 per cent.) and the last portions (10 to 15 per cent.) are set on one side, and treated again like the impure sulphide. The pure product has an ethereal odor, and its boiling-point is constant to about 0.002° ; this is contrary to the results found by Arctowsky. A variation of 1 Mm. in the atmospheric pressure causes a variation of 0.04144° in the boiling-points. At a boiling-point of 46.25° , the density = 1.2209. This density varies considerably when the boiling takes place under pressure slightly different from the atmospheric pressure. For example, at 756.6 Mm., and with a boiling-point of 46.10° , the density = 1.22161.—Chem. News, Febr. 12, 1904, 83; from Zeit. Anorg. Ch., xxxii, 407.

Carbon Disulphide—Simple Tests for its Presence.—P. Bompard recommends the following simple test for carbon disulphide, which depends on the formation of an intensely yellow compound—copper xanthogenate. Ten Cc. of the liquid being placed in a test-tube, the mouth of the tube is covered with a piece of paper moistened with an alcoholic solution of caustic potash, and the liquid is heated to boiling. The test paper is now

removed and moistened with a few drops of 5 per cent. cupric sulphate solution. In the presence of 1 : 2000 of carbon disulphide, the paper will assume an intense yellow color.—Pharm. Journ., Jan. 9, 1904, 29; from Report, 14, 476.

Carbonic Anhydride—Action on the Ammonium Metals.—According to the researches of Etienne Rengade, carbonic anhydride reacts on sodium-ammonium and potassium-ammonium, the character of the reaction depending on the temperature. Below -50° it forms exclusively alkaline carbonate with evolution of hydrogen. At a rather higher temperature an alkaline formate is simultaneously produced, a portion of the hydrogen evolved in the first reaction being thus absorbed. This production of formate by nascent hydrogen and carbonic anhydride in presence of an ammonium metal is analogous to the synthesis effected by M. Moissan by means of the alkaline anhydrides and carbonic anhydride.—Chem. News, April 8, 1904, 179; from Compt. rend., 88 (1904), No. 10.

Carbonic Acid—Determination in the Presence of Chlorine—C. Oppenhaus has used with advantage the following method for determining carbon dioxide in electrolytic chlorine, in which it is always present, sometimes to the amount of 5 per cent.: The mixed gases were stored in a glass gasometer, and were led through concentrated sulphuric acid before passing into the Bunte's burettes, in which the analyses were carried out. (1) A known volume of the gas was treated in a burette with potassium iodide solution and the liberated iodine titrated as usual, the necessary corrections for temperature and pressure being made. In a second burette the chlorine and carbon dioxide were both absorbed by $\frac{N}{5}$ sodium hydroxide solution. On measuring the unabsorbed residue the volume of the chlorine and carbon dioxide together was obtained, the carbon dioxide being then found by difference. Allowance was made for the fact that the residue of gas was measured when moist. (2) The carbon dioxide and chlorine were absorbed in a burette by exactly 45 Cc. of an $\frac{N}{5}$ sodium hydroxide solution, the amount of carbon in which had been previously determined. The alkaline solution was then shaken with 5 to 10 Cc. of 3 per cent. hydrogen peroxide solution, to convert the hypochlorite into chloride ($\text{NaOCl} + \text{H}_2\text{O}_2 = \text{NaCl} + \text{H}_2\text{O} + \text{O}_2$). After making the solution up to a known volume with water free from carbon dioxide, the amount of carbonate in it was determined. The author states that chlorine cannot be determined by absorbing the gas in sodium hydroxide solution and titrating the hypochlorite formed, as some chlorate is always produced, even when dilute sodium hydroxide solution is employed.—Zeits. Angew. Chem., 16, 1033, through Journ. Soc. Chem. Ind.

Carbonate—Estimation in Sodium Sulphite.—The estimation of carbonate in the presence of sulphite by the usual difference method being unsatisfactory, Carl G. Hinrichs adopted the following method, which is

based upon the oxidation by hydrogen peroxide of the sulphite into sulphate, and thus removing the element of contamination when carbonic acid is developed in the usual way: Weigh out a gramme of the sodium sulphite, dissolve in about 10 Cc. of water; now add 10 Cc. of 25 vol. peroxide or 20 Cc. 10 vol. peroxide, previously made alkaline with fixed or volatile alkali: a warming is noted due to reaction; now complete reaction by gently heating. All sulphite is now present as sulphate, together with all the carbonate and excess of peroxide used. Dilute with warmed water, add excess of barium chloride; all sulphate and carbonate is precipitated as barium salt. Filter off the precipitate wash with water, remove all peroxide used in excess, transfer to a beaker the filter-paper with precipitate. Add 20 Cc. of $\frac{N}{2}$ hydrochloric acid, warm to expel CO_2 , add phenolphthalein: now run in from the other burette $\frac{N}{2}$ alkali until a red color appears. The difference is the amount of carbonate present in the sulphite tested.—West. Drugg., February, 1904, 59.

CYANOGEN COMPOUNDS.

Cyanogen—Volumetric Estimation in Presence of Chlorides.—When the blue solution, produced by adding ammonia to a cupric salt, is added to potassium cyanide, the color disappears until this cyanide has been completely converted into copper cyanide, when the blue solution ceases to be decolorized. John M. McDowell finds the finish to be very sharp, and recommends the reaction for the volumetric estimation of cyanides, particularly in the presence of chlorides, in place of the silver assay usually employed. The standard solution is made by dissolving 25 Gm. of copper sulphate in about 500 Cc. of water, adding ammonia to form a clear blue liquid, and then enough water to make 1 liter. The substance to be tested, 0.5 Gm. of cyanide, for instance, is dissolved in 100 Cc. of water, 5 Cc. of ammonia added, and the blue solution run in with constant stirring—towards the last—when the color begins to disappear slowly, drop by drop. The final drop is sufficient to tinge the colorless solution a light blue. The method has proven accurate.—Chem. News, May 13, 1904, 229.

Hydrocyanic Acid—Hydrogen Peroxide an Antidote.—Hertig recommends peroxide solution as an antidote for poisoning by hydrocyanic acid owing to the formation of oxamide, which is stated to be harmless, by the direct combination of the two substances, according to the equation $2\text{CNH} + \text{H}_2\text{O}_2 = \text{CO}-\text{NH}_2-\text{CO}-\text{NH}_2$.—Südd. Apoth. Ztg., 1903, 216.

Potassium Cyanide—Silver as an Impurity.—K. Friedrich finds that silver is frequently met with as an impurity in potassium cyanide, and that even in a specimen sold as "*Kalium cyanatum purissimum pro analysi*," as much as 0.0012 per cent. was detected. It view of the use of the salt in metallurgical assays, the possible presence of silver as an impurity should be guarded against.—Pharm. Centralh., 44, No. 37 (Sept. 10, 1903), 617; from Ztschr. f. angew. Chem., 1903, 776.

Silver Cyanide—Quantitative Separation from Silver Chloride.—Freshly precipitated silver cyanide, although insoluble in cold dilute nitric acid, readily dissolves in the boiling acid, evolving the theoretical quantity of hydrogen cyanide, so that the gas, when passed into silver nitrate solution, produces an amount of silver cyanide equal in weight to the sample originally employed. R. H. A. Plimmer suggests that in this way silver cyanide may be quantitatively separated from silver chloride. When the cyanide has been dried at 100° , the hard lumps produced offer a greater resistance to the solvent, and if the boiling is prolonged, the acid, on becoming more concentrated, oxidizes a small proportion of the hydrogen cyanide.—Pharm. Journ., Jan. 9, 1904, 28; from Proc. Chem. Soc., 19, 285.

Mercuric Oxycyanide—Composition and Preparation.—The recent demand for mercuric oxycyanide for antiseptic use in preference to corrosive sublimate has induced Dr. E. Holdermann to make some inquiries into the nature, composition and method of preparation of this compound, with the particular object of devising an extempore method for its preparation when the compound is not procurable from wholesale dealers. In the course of his investigations, the author found that the processes given in the literature are evidently based on the assumption that the oxycyanide is an equi-molecular double salt— $\text{Hg}(\text{CN})_2 \cdot \text{HgO}$. He proves experimentally, however, that the soluble oxycyanide should have a much larger CN content, and that its formula should be $\text{HgO}_3\text{Hg}(\text{CN})_2$. In conformity with this, he has devised the following extemporaneous method for its preparation: Dissolve 28.0 Gm. of mercuric chloride ($= 22.23$ Gm. HgO) in 600 Cc. of distilled water, pour this solution in a thin stream into a warm mixture of 70 Gm. of 15 per cent. soda solution and 200 Cc. of distilled water, and wash the precipitate produced with water, by decantation, until the washings are completely freed from chlorine. The precipitate is then suspended in from 300 to 400 Cc. of distilled water, heated on a water bath, a solution of 77.8 Gm. of mercuric cyanide in 250 Cc. of hot water is added, and the heating continued until the mercuric oxide is dissolved. The solution is then filtered, evaporated on the water-bath to crystallization, and then transferred to a drying closet for complete desiccation. The yield is 100 Gm. mercuric oxycyanide.—Arch. d. Pharm., 242, No. 1 (Jan. 31, 1904), 32–36.

Mercuric Oxycyanide—Bactericidal Value.—According to the researches of Lehmann, mercuric oxycyanide appears to be about equal to mercuric chloride in disinfectant and bactericidal properties. It possesses, however, the great advantage over corrosive sublimate, that bright metallic instruments may be immersed in a 1 to 1.5 per cent. solution of the salt containing 0.5 per cent. of sodium carbonate or bicarbonate, without damage to their polish or cutting edges. The bacteriological tests were made upon *Micrococcus pyogenes*, *Bacillus mesentericus*, and Anthrax spores.—Oesterr. Ztg., 1903, 851.

ALKALIES.

Alkaline Persulphates—Volumetric Method of Titration.—C. Marie and L. J. Brunel recommend the following simple method for the volumetric analysis of alkaline persulphates: From 0.3 to 0.4 Gm. is dissolved in 100 Cc. of water and the solution neutralized, using methyl orange as an indicator. Two Cc. of pure methyl alcohol is then added and the mixture first heated to 70-80° C. for five minutes, and then boiled for ten minutes. After cooling, it is titrated with $\frac{N}{10}$ NaOH solution with methyl orange as indicator. One Cc. of the standard solution is equivalent to 0.0135 Gm. of potassium persulphate, 0.0119 Gm. of sodium persulphate, and 0.0114 Gm. ammonium persulphate. Tarriggi's method of boiling a solution of ammonium persulphate with sufficient sodium hydrate to replace the volatile alkali, is shown to give too high results. This does not occur when methyl alcohol is present.—Analyst, 27 (1904), 371; from Bull. Soc. Chim., 29, 986.

Ammonia—Double Function in Aqueous Solution.—C. Frenzel has endeavored to solve the question whether in aqueous solution the ammonia is combined with the water in an almost complete manner, forming a very feeble base, or whether the major portion exists simply in solution, a small fraction only being in combination forming a powerful base. The author has already shown that the conductivity of liquid NH_3 is considerably diminished by the addition of traces of water, while a subsequent addition exercises only a very feeble influence on the conductivity. The very slight tendency of trivalent nitrogen to change into pentavalent nitrogen, the thermochemical data relating to the history of ammonia, and the hydrolysis of the ammoniacal salts, are all facts in favor of the hypothesis of a feeble base. Ammonia possesses a double function—a very slightly acid one with trivalent nitrogen, and a very strongly basic function with pentavalent nitrogen (NH_4HO , for example); between these two functions a well-defined equilibrium should be established in each case. For the same solution the product of the acid function and of the basic function of the ammonia remains constant, and is independent of the nature of the acid added. The formation of nitrogen in the electrolysis of solutions of ammonia is the result of a secondary action of the anodic oxygen on the solution, $4\text{NH}_3 + 3\text{O}_2 = 2\text{N}_2 + 6\text{H}_2\text{O}$. Even concentrated solutions only give small quantities of oxygen.—Pharm. Journ., Jan. 9, 1904, 28; from Zeit. Anorg. Ch., 32, 319.

Ammonium Carbonate—Presence of Lead.—Since calling attention to the presence of lead in *acetic acid* (which see under "Organic Chemistry"), C. T. Bennett has observed that the presence of this metal in solution of ammonium acetate may be due to the ammonium carbonate used for saturating the acid. He finds, however, that the quantity of lead present is not very great, being about 1 in 20,000 in the worst samples examined.—Chem. & Drugg., Jan. 30, 1904, 203.

Lithium Salts—General Review.—P. E. Kaler and L. E. Sayre communicate a paper on lithium salts, in which they give a general review of their source, their character and the nature of the impurities likely to be found in them. While the U. S. P. recognizes the bromide, carbonate, salicylate, benzoate and citrate, the latter salt and the carbonate are unquestionably the most important. Manufacturers have been supplying a salt under the name of *Lithium Bicarbonate*. It has been already pointed out by Kebler (see Proceedings 1901, 779) that such a compound has never been prepared except in solution, and the examinations of a sample of the so-called lithium bicarbonate appear to confirm Mr. Kebler's view that such a compound has not yet been obtained in the dry state. The sample examined consisted to the amount of 97.97 per cent. of lithium carbonate. Concerning the official

Lithium Citrate, the authors are inclined to the belief that the U. S. P. requirement of 99.02 per cent. of pure lithium citrate is too high. It is true that Kebler found from 98.56 to 99.05 per cent. of lithium citrate in numerous samples from different parts of the United States, but these figures apply to unbroken packages, and were not obtainable from samples of the market procured by the authors, which were assayed from 75.5 to 86 per cent. of pure lithium citrate. The authors mention, furthermore, that Kebler's method for the estimation of pure lithium citrate in the salt is a most excellent one to work alongside of and checking the U. S. P. method.—Drug. Circ., 48, No. 2 (Feb., 1904), 28.

Lithium Carbonate—Decomposition by Heat.—T. Lebeau finds that when lithium carbonate is heated it begins to decompose at about 600° C., but that even at that temperature the vapor tension of the lithium oxide formed is such that it may be completely volatilized. This property distinguishes lithium carbonate from the other alkaline carbonates.—Pharm. Journ., Sept. 26, 1903, 453; from Compt. rend., 136, 1256.

Potassium—Rapid Method of Determination in Agricultural Compounds.—With the increasing application of potassium salts in agriculture, a rapid method of determining potassium becomes a question of some importance. Such a method is applied by N. Tarngi in the May number of the *Gazzetta*, in which he describes a volumetric method of estimating the element which depends on its precipitation in the form of the sparingly soluble persulphate. The method is accurate, and can be carried out with great rapidity. Incidentally, the existence in aqueous solution at temperatures between 0° and 40° of four hydrates of potassium persulphate is established.—Pharm. Journ., June 25, 1904, 852; from Nature, 70, 131.

Potassium Persulphate—Action on Phosphorous and Hydriodic Acids.—Wilhelm Federlin has studied the nature of the influence exerted by the presence of hydriodic acid in a mixture of potassium persulphate and phosphorous acid. Persulphate only oxidizes phosphorous acid very

slowly, while it rapidly transforms hydriodic acid into iodine ; on the other hand, iodine rapidly oxidizes phosphorous acid. The addition of hydriodic acid to a mixture of persulphate and phosphorous acid thus accelerates the reaction of these two bodies one on the other ; in this manner the hydriodic acid would play the part, in this reaction, of a catalyzer by transport. The examination made by the author of the total speed of the reaction, as well as of those of the two simple reactions of which it is the result, shows that if we put on one side the interference caused by the presence of PO_2H_3 in the reaction of $\text{S}_2\text{O}_8\text{K}_2$ on KI , and also take note of the incorrectness of the mathematical formula used, there is sufficient concordance between the speed observed and the speed calculated from the speeds of the component reactions. These latter, therefore, have not any particular influence on each other.—Chem. News, Oct. 2, 1893, 173 ; from Ztschr. f. Physik. u. Chem., XII., 565.

African Natural Soda—Composition of Two Sorts.—Dr. G. Fendler describes two kinds of native soda from Togo, the one known under the name of "Gurnu," the other as "Kanua," both of them finding useful application as mild laxatives for cattle and by the natives. The composition of these salts is the following :

"Gurnu" : Na_2O , 39.45 per cent. ; CO_2 , 39.04 per cent. ; Cl , 0.37 per cent. ; water, 19.45 per cent. ; impurities (sand and other insoluble substances), 1.72 per cent.

"Kanua" : Na_2O , 38.36 per cent. ; CO_2 , 35.10 per cent. ; SO_3 , 0.73 per cent. ; Cl , 0.96 per cent. ; water, 24.30 per cent. ; impurities (sand, etc.), 0.63 per cent. These native saline compounds promise to become valuable articles of export.—Apoth. Ztg., XVIII., No. 54 (July 8, 1903), 467.

Sodium Percarbonate—Characiers and Constitution.—In continuation of previous researches on sodium percarbonate, $\text{Na}_2\text{CO}_3 + \frac{3}{2}\text{H}_2\text{O}_2$, obtained by the action of H_2O_2 on a solution of Na_2CO_3 , S. Tanatar contributes the results of some further investigations concerning its nature and constitution. In aqueous solutions this salt gradually decomposes into Na_2CO_3 and H_2O_2 ; thermo-chemical determinations have shown that the solution of this salt in water is different from a mixture of solutions of Na_2CO_3 and H_2O_2 ; only as no percarbonate of the heavy metals by the reciprocal action of Na_2CO_3 and the salts of these metals have been obtained, it may well be asked whether the percarbonates are not carbonates in which the H_2O_2 has replaced the water of crystallization. The discovery of certain compounds ($\text{KF} + \text{H}_2\text{O}_2$; $\text{NaSO}_4 + \text{H}_2\text{O}_2 + 9\text{H}_2\text{O}$) seems to confirm this idea. In an attempt to solve this question, the author has endeavored to find the coefficient for the division of H_2O_2 between water and ether, then between a solution of Na_2CO_3 and ether ; he found that by the addition of Na_2CO_3 , about 30 per cent. of the possible quantity of H_2O_2 unites with

the salt. Thus percarbonate of sodium in solution is only partially decomposed into Na_2CO_3 and H_2O_2 . Further, many of the salts of the hyperacids behave in this manner. The rise of temperature and the diminution of the concentration increases the hydrolysis. Though these facts may not be sufficient to draw accurate conclusions, the author thinks that percarbonic acid, and the hyperacids in general, contain true higher oxides of the elements.—Chem. News, March 31, 1904, 168; from Journ. Soc. Phys. Chim. R., xxxiv, 952.

ALKALINE EARTHS.

Alkaline Earths—Separation.—Robin recommends the following method for the separation of barium, strontium and calcium: The substance is treated so as to afford a solution of chlorides or nitrates of these metals. If it be acid it is rendered slightly ammoniacal. About 2 per cent. of pure ammonium chloride, free from sulphate, is then added, and the mixture acidified with acetic acid, boiled, and the boiling liquid treated with excess of potassium bichromate, as shown by the production of a reddish tint in the solution, which is then again boiled for five minutes. After cooling, this is filtered to separate the barium chromate. The precipitate is washed first with a 0.5 per cent. tepid solution of ammonium acetate rendered faintly alkaline with ammonia, then with sufficient water, containing 10 per cent. of alcohol, to remove the soluble salts. When thoroughly washed the filter is dried at 100° – 110° C. for two hours, and weighed as barium chromate. The filtrate is made alkaline with ammonia and boiled, then treated with 3 to 4 per cent. of crystalline ammonium sulphate. After boiling for fifteen minutes, taking care to maintain the alkalinity with more ammonia, it is allowed to cool, and the precipitated strontium sulphate is collected on a filter, washed first with water, containing 0.5 to 1 per cent. of ammonium sulphate, rendered alkaline with ammonia, and then with a solution of 10 per cent. of alcohol in water; the precipitate is then dried, incinerated, and weighed as strontium sulphate. The filtrate is heated to 80° C., treated with ammonium oxalate, and allowed to stand for half an hour. The calcium oxalate is then collected, washed with slightly ammoniacal water, dried, incinerated and weighed as carbonate, or converted into sulphate, and weighed as calcium sulphate.—Pharm. Journ., Nov. 14, 1903, 701; from Comp. rend., 137, 258.

Alkaline Earths.—Formation and character of *Acetates*, which see under "Organic Chemistry."

Magnesium Amalgam—Use in Synthetic Operations.—According to L. Meunier magnesium amalgam and the alcoholates resulting from its use can be employed in a number of syntheses, and especially in the preparation of diphenyl-methane and the ethyl derivatives of ethyl-malonate. The author proves that the action of the mixed organo-magnesium salts described by Grignard on ethyl-malonate acts first on the group $\text{CH}_2<$,

then on the ether-salt functions, whilst the action of magnesium in the state of amalgam on the same compound only attacks the group $\text{CH}_2\text{<}$.—Chem. News, Dec. 4, 1903, 281; from Compt. rend., 87, 1903, No. 18.

Magnesium Carbonate, B. P.—Variability in Composition and its Causes.—In an experience of some years in the quantitative examination of the the official (B. P.) magnesium carbonates (light and heavy), J. G. Ferrier observed a conspicuous want of uniformity in the results obtained. In further investigation, he prepared small quantities of the light and heavy carbonates, following implicitly the pharmacopœial process throughout, but these were no nearer the standard than those previously examined. The

Light Magnesium Carbonate so made yielded 24.0 per cent. of total magnesium, or 0.508 per cent. less than that required by the official standard. The sample yielded 33.9 per cent. of carbon dioxide instead of 34.4 per cent. This amount of carbon dioxide being necessarily combined with 18.76 per cent. of magnesium, it follows that 6.23 per cent. of the total magnesium existed as hydroxide. There was thus a deficit in hydroxide of 0.3 per cent. The weight of water in the salt was arrived at by difference and proved to be in excess to the extent of nearly 2 per cent. In the case of the

Heavy Magnesium Carbonate, carbon dioxide was short by 0.69 per cent., and magnesium hydroxide by 0.39 per cent., with water in correspondingly greater ratio. The author's experiments show that on mixing solutions of magnesium sulphate and sodium carbonate the resulting precipitate, owing to the prevailing conditions being favorable to hydrolysis, consists not of normal carbonate, but of a mixture of carbonate and hydroxide. Magnesium not being a particularly strong base and carbonic acid a relatively weak acid, hydroxide is produced hydrolytically with evolution of carbon dioxide. Magnesium hydroxide being but slightly soluble in water, its solubility product is quickly attained, and there is almost immediate precipitation, the hydroxide attaching itself to, or mixing with, the magnesium carbonate (MgCO_3) already thrown out. The relative quantities of carbonate and hydroxide are dependent on the concentration and temperature of the solutions of the reacting salts. Rise of temperature and increased dilution induce an increase of hydroxide with a corresponding loss of carbonate. That washing with water has an appreciable influence on the salt was demonstrated as follows: A portion of the sample of light carbonate, placed on a calico filter, was washed at regular intervals with cold water during six weeks. One sample was removed at the end of a fortnight, another two weeks later, and these and the residue after six weeks' washing were dried at 100°C . and estimated. Using the official formula for arithmetical purposes No. 1 indicated 99.1 per cent., No. 2 indicated 99.4 per cent., and No. 3 indicated 99.45 per cent. Normal carbonate (MgCO_3) had gradually disappeared, and at a

diminishing rate, the greatest loss occurring during the first stage of washing, that decomposed after a month's time being almost negligible. The author submits that, in view of the internal changes to which this compound is so liable, it would be advisable that a note to this effect be attached to its monographs in subsequent editions of our Pharmacopœia. No arbitrary formula seems justifiable, the number of molecules of carbonate, hydroxide and water should be indicated in terms of "X."—Pharm. Journ., April 30, 1904, 586.

Lime—Action of Carbon at the Melting-Point of Platinum.—H. Moissan finds that at the fusing-point of platinum it is not possible to obtain calcium carbide by the reduction of lime with charcoal. Mixtures of lime and sugar charcoal, in suitable proportions, were heated together in quartz tubes in the flame of a coal-gas-oxygen blow-pipe, in an atmosphere of hydrogen; although platinum was melted in this apparatus in five minutes; an intimate mixture of charcoal and lime, exposed to the same temperature for ten minutes, gave no indication of the formation of even a trace of calcium carbide; the mixture, when cold, giving no acetylene when treated with water. In the course of the experiments it was observed that silica has a vapor tension below its temperature of softening. Crystals of calcium silicate were observed to form on the surface of the lime at a temperature of about $1,200^{\circ}$ C. before the containing quartz tube became softened. This notable vapor tension of silica, below its melting-point, will, unfortunately, limit the usefulness of quartz tubes in experiments at high temperatures: Calcium carbide in the crystalline state, was found to have a higher melting-point than platinum; exposed to this temperature, the surfaces of the crystals were not even affected. On the other hand, platinum wire plunged into calcium carbide at the moment when it was solidifying after melting in the electric furnace, was immediately fused.—Pharm. Journ., April 9, 1904, 492; from Comp. rend., 138, 243.

Precipitated Calcium Carbonate—Test for the Presence of Magnesia.—Several years ago (1898) Dr. Paul Hamboyer pointed out the necessity of testing the precipitated calcium carbonate to be used in the preparation of solution of aluminium acetate for the absence of magnesia, proposing for this purpose the following method: "If 1 Gm. of calcium carbonate is repeatedly shaken with 10 Cc. of solution of ammonium chloride and 1 Cc. of ammonia water, allowed to stand 5 minutes and then filtered, the filtrate should only show faint opalescence after addition of 8 drops of solution of sodium phosphate." This method depends on the ready solubility of the double salt of magnesium and ammonium chloride formed, while only traces of calcium carbonate are taken into the solution. Dr. Richard Witte has now subjected this test to critical examination, which leads him to the conclusion that this very simple test is available only if the absence of chloride and sulphate has previously been determined, and if, in the event of a decided turbidity or precipitate being produced under

the conditions of the test, an absolute identification of the magnesia be made. This is done by adding ammonium oxalate to the original filtrate, which precipitates the calcium salt as oxalate, and then testing the filtrate from this with sodium phosphate as directed in Hamboyer's original test.—*Apoth. Ztg.*, 18, No. 52 (July 1, 1903), 449.

Plaster of Paris—Phenomena Involved in the Setting.—Ch. Cloëz finds that when anhydrous plaster of Paris is thrown into a certain quantity of water the temperature rises rapidly to 14° – 22° C. above the original temperature; then in about ten minutes it drops from 4° to 6° and remains stationary for some time, and finally rises again, reaching a point higher than the one it first went to. This series of phenomena is absolutely independent of the amount of water used for mixing. Experiments were made, and the results are shown in curves, to determine the best proportion of water and plaster necessary to obtain sufficient hardness when the plaster was set. The setting of the plaster is proved to be due to the succession of the following three phenomena: 1, hydration; 2, solution; 3, solidification of a supersaturated solution.—*Chem. News*, July 31, 1903, 58; from *Bull. Soc. Chim.*, Series 3, xxix., No. 4.

Plaster of Paris—Solubility in Salt Solutions and Absorption of Moisture.—In continuation of his experiments on plaster of Paris, Ch. Cloëz has obtained the following results on its solubility in solutions of sea-salt:

Weight of NaCl in 100 Cc. of water.	Weight of gypsum dissolved.
Gm.	Gm.
0.0	0.2
2.44	0.635
4.77	0.826
9.50	1.056
14.22	1.193
23.15	1.275
31.3	1.583

Thus the solubility of gypsum in solutions of chloride of sodium increases in a regular manner with the concentration of these solutions. The determinations were made at a temperature of 14° C. on solutions remaining in contact for three months with an excess of pure hydrated sulphate of lime, the solutions being stirred up every day. It was, furthermore, found by experiment that anhydrous plaster of Paris absorbs moisture when exposed to the air in the following quantities according to the time of exposure:

In 1 hour it absorbs 3.70 per cent. of water.

In 2 hours it absorbs 4.27 per cent. of water.

In $3\frac{1}{2}$ hours it absorbs 5.70 per cent. of water.

In 19 hours it absorbs 7.57 per cent. of water.

In 27 hours it absorbs 7.77 per cent. of water.

In 74 hours it absorbs 7.93 per cent. of water.

The above experiments were carried out at 14° – 16° C. At a low temperature the absorption takes place more slowly, but it reaches the same limit. Anhydrous plaster, which is very easy to prepare, is an excellent dehydrating material, by which means alcohol can be brought easily from 90° to 98° .—Chem. News, Aug. 7, 1903, 71; from Bull. Soc. Chim., (3), xxix., No. 4.

Hydrated Sulphate of Lime—Solubility in Solutions of Sea Salt.—Alex. D'Anselme has also investigated the solubility of gypsum in solutions of sea salt, and has obtained figures which differ considerably from those recorded above in a paper of Cloëz. The subject is one of considerable importance in the manufacture of soda ammonia, for which saturated solutions obtained by dissolving the sea salt (obtained from salt marshes), in fresh water, free from salts of magnesium, is used. These solutions always contain a considerable proportion of sulphate of lime, in the author's experience in analyses for several years never less than 2.5 Gm. per liter, an impurity which is of considerable inconvenience in the utilization of these brines, as it is precipitated under the influence of CO_2 and NH_3 gas. By a method described in detail, the author made two series of experiments to determine the solubility of the lime salt in solutions of chloride of sodium of different strengths, one at 14° and the other at 20° C., with results as follows:

NaCl, per liter.		Anhydrous SO_4Ca dissolved, per liter.	
Grms.	Molecule.	At 14° .	At 20° .
0	N/ ∞	1.70	2.10
2.925	N/20	2.32	2.70
5.850	N/10	2.79	3.15
11.70	N/5	3.41	3.75
14.62	N/4	3.68	4.00
29.25	N/2	4.40	4.70
58.50	N	5.72	6.00
87.75	N $\frac{1}{2}$	6.58	6.85
102.3	N $\frac{3}{4}$	6.90	7.15
117.0	2N	7.10	7.30
131.6	2N $\frac{1}{4}$	7.20 (max.)	7.30 (max.)
146.2	2N $\frac{1}{2}$	7.10	7.13
160.8	2N $\frac{3}{4}$	7.00	7.05
175.6	3N	6.80	6.80
204.7	3N $\frac{1}{2}$	6.30	6.30
234.0	4N	5.90	5.90
263.2	4N $\frac{1}{2}$	5.50	5.52
292.6	5N	5.30	5.30

These figures show that as the proportion of NaCl increases, the solubility of the gypsum increases at first rapidly, then slowly until it reaches a maximum; that in solution only slightly charged with NaCl, the solubility varies but little with the temperature; but that at the saturation

point the solubility is decidedly greater than it is in pure water.—Chem. News, Jan. 1, 1904, 9; from Bull. Soc. Chim. (3), xxix, No. 9.

EARTHS.

Rare Earths—Method of Exact Separation.—G. Urbain and H. Lacombe observe that while the fractional crystallization of two salts which are not isomorphous, can never result in the production of either the least soluble or the most abundant in a state of purity, in the case of isomorphous salts the phenomena are quite different. By a series of fractional crystallizations, properly carried out, a mixture of isomorphous salts can be separated into its constituents in the order of their solubility, and after a sufficient number of fractionations, each one will be obtained pure. Moreover, it is observed that in a mixture of isomorphous salts, a more soluble member of the series diminishes the solubility of a less soluble one, and there is a tendency of the salts to substitute each other in the crystalline deposit formed. It is this tendency that enables, in certain cases, the separation of the least soluble salts in a pure state from those which accumulate in the mother liquor, this separation being so exact that even the most delicate tests fail to discover a trace of the least soluble salts at the opposite end of the fractionation. Furthermore, it is found that the best results are obtained by crystallizations of the relatively soluble salts, and that double salts, where the differences of solubility between its members are usually greater than those of simple salts, can be most conveniently separated by this method. These remarkable properties of isomorphous salts are utilized with advantage to separate elements whose properties vary slightly from one member to another, as in the family of the rare earths. In all cases, the great difficulty of fractional methods for the separation of the rare earths is the presence of intermediate portions, which, though they can often be considerably reduced, can never disappear altogether, except in the following cases: When an element, usually separated with no difficulty from a rare earth, presents a case of isomorphism. Also, if the solubility of the salt of the common element is intermediate between the two members of the series. An example of such a case is the isomorphism of the double nitrate of magnesium and bismuth with the double nitrates of magnesium and the rare earths. In a preliminary examination the authors compared this bismuth compound with the corresponding salts of the *samarium-gadolinium* group, and conceived the idea that if a certain portion of bismuth-magnesium nitrate is added to the magnesium nitrates of these earths, the element bismuth will, little by little, be inserted between the two rare earths, gradually separating the elements. A simple precipitation by hydrogen sulphide will then eliminate the bismuth, and a vigorous separation of the two rare earths should thus be obtained. Experiments, which are given in outline, have confirmed this opinion. They show conclusively that bismuth inserts it-

self between samarium and gadolinium.—Chem. News, Dec. 18, 1903, 295 ; from Compt. rend., 87 (1903), No. 20.

Rare Earths—Bismuth as a Means of their Separation.—In continuation of their foregoing researches, the authors have directed their attention particularly to the separation of their associate element, Demarçay's europium, which exists only in minute quantities as compared with gadolinium and samarium in the rare earths, but the authors have now been able to assign a place to this element in the separation. They find that by examination of the absorption spectrum of europium and of its spark spectrum, bismuth inserts itself exactly between samarium and europium. Bismuth, therefore, apparently divides the two large groups of the rare earths, and from this the authors conclude that europium can be considered as the first term of the series of the yttria earths. The authors are confirmed in the utility of the bismuth-magnesium nitrate for the separation of the different members of the rare earth, as outlined in their previous paper. They find further that the methodical fractionation of the bismuthic-gadoliniferous nitrates in the same order in which they have been obtained allows the rigorous separation of the ceric and yttric earths. The insolubility of the magnesium nitrates of the earths which precede samarium in the solution of the double nitrate of bismuth allow of the separation of these earths from soluble samaria with an almost quantitative yield.—Chem. News, Jan. 29, 1904, 52 ; from Compt. rend., 88 (1904), 84.

In a third paper, Urbain and Lacombe deal only with

Europium—Its Separation from Gadolinium and its Atomic Weight.—They find that the magnesium salts of europium have nearly the same solubility as those of bismuth, whilst the same salt of gadolinium is considerably more soluble. Hence it is tolerably easy to separate europium from gadolinium in the tail of the fractionation. The authors then proceed to calculate the atomic weight of europium—(1) By the transformation of the hydrated sulphate into the anhydrous sulphate ; (2) by the transformation of the anhydrous sulphate into the oxide ; and (3) by the transformation of the hydrated sulphate into the oxide. The results reciprocally check one another, and give almost identical results. The authors therefore conclude that the atomic weight of europium is definitely 151.79, and they estimate that this number differs from the real number by less than 0.06.—Chem. News, April 8, 1904, 179 ; from Compt. rend., 88 (1904), No. 10.

Ceric Earths—Separation by the Aid of their Manganese Double Nitrates.—In continuation of experiments made in conjunction with G. Urbain on the separation of the rare earths (which see) by fractional crystallization of certain double nitrates, H. Laborde has now experimented in the hope of obtaining an easier separation by the aid of a salt whose solubility is less than that of the double alkaline nitrates, and thus

facilitate the separation of the components of the *old* didymium, and particularly the earths rich in neodymium and in praseodymium. He finds such a salt in the "double nitrates of manganese," corresponding to the type $2\text{Di}(\text{NO}_3)_2 + \text{Mn}(\text{NO}_3)_2 + 24\text{H}_2\text{O}$, and gives the details of the method by which the separation of these components of the ceric earths is conveniently accomplished.—Chem. News, June 10, 1904, 228; from Bull. Soc. Chim. (3), xxxi, No. 10.

Didymium and Praseodymium—Influence of the Presence of Cerium.—While engaged in the fractionation of didymium by the action of chlorine on the hydrate suspended in an alkaline medium, R. Marc was led to the following conclusions: Oxide of didymium is grey in color when it is perfectly free from cerium, otherwise it is brown. Below 2 per cent. cerium can only be detected in didymium by the color of the oxide, and no longer by means of peroxide of hydrogen or persulphate of ammonium. The amount of peroxide contained in a brown didymium poor in praseodymium, is proportional to the amount of cerium it contains, provided the latter is not very much. If the proportion of cerium exceeds a certain limit the oxidation extends, not only to the praseodymium, but also to the neodymium; but in the absence of praseodymium, the neodymium is no longer oxidized by cerium. Lanthanum and neodymium prevent the oxidation of praseodymium. In the absence of these two metals the praseodymium is immediately and completely peroxidized by the least trace of cerium; but the smallest quantity of lanthanum or praseodymium retards the oxidation considerably.—Chem. News, July 10, 1903, 24; from Berichte, vol. xxxv, p. 2371.

Europium—Extraction from Monazite Sands, Characters and Salts.—By fractionally crystallizing the nitrates of the rare earths from half a ton of monazite sands, and taking advantage of the isomorphism and intermediate solubility of bismuth magnesio-nitrate, and that of the magnesio-nitrates of the rare earths, G. Urbain and H. Lacombe have obtained pure europium salts. Samarium and gadolinium being thus eliminated, the remaining magnesium salts of gadolinium and europium concentrated in the last fractions were finally separated by means of the greater solubility of the former. After some 3,000 crystallizations, six fractions were obtained which gave no spectroscopic indication of the presence of gadolinium. No difference has been observed in the fractions of pure europium, and if this body be a mixture, it cannot at any rate be split up by fractionating as magnesium salts. Moreover, the atomic weight 151.79 remains constant.

Europium Sulphate, precipitated with alcohol, and recrystallized from water, forms neutral well-formed crystals, having a barely perceptible rose tint. Their formula is $\text{Eu}_2(\text{SO}_4)_3 + 8\text{H}_2\text{O}$. This salt is permanent in the air; it is rendered anhydrous at 375°C. ; when calcined it is entirely converted into oxide at $1,600^\circ \text{C.}$, which is of a distinctly rosy tint, whereas the

oxide prepared from the oxalate at a low temperature is white, with only the faintest rose tint when seen in mass.—Pharm. Journ., May 14, 1904, 649; from Compt. rend., 138, 628.

Pure Samarium Oxide—Preparation and Atomic Weight.—By a method and treatment similar to that employed by G. Urbain and H. Lacombe for the separation of pure *Europium* (which see), these authors have obtained about 150 Gm. of rigorously pure samarium oxide from a mixture of rare earths (godolinite, monazite sands, etc.). They have also redetermined the atomic weight of samarium with this absolutely pure product, and thus have been enabled to give figures, shown in a table, of the atomic weight of the various compounds of samarium, based, for the first time, upon results obtained from samarium absolutely free from europium and gadolinium. The atomic weight of samarium, admitting $O = 16$, does not differ sensibly from 150.34, the figures previously given by Cleve and Demarçay being respectively 150 and 148.—Chem. News, June 10, 1904, 277; from Compt. rend., 88, 1904, No. 19.

Terbium Oxides—Properties.—According to R. Marc, terbium has two degrees of oxidation, a lower, colored oxide, which has a very marked brown-ochre coloration, and a colorless peroxide. The oxide which has heretofore been described was nothing better than a mixture of yttria with other heavier earths, which were colorless and had no absorption spectrum (undoubtedly ytterbium), and were colored by a little terbium. The absorption spectrum of terbium appears to be characterized by a band, $\lambda = 464-461$. Its atomic weight is about 157.—Chem. News, July 3, 1903, 11; from Berichte, 35, 2382.

Zirconia—Preparation from the Carbide.—E. Wedekind has adopted the following method for preparing zirconia: An intimate mixture of 20 parts of zircon, 12 parts of lime and 7 parts of carbon is heated in a carbon crucible in the electric furnace. The crucibles, which are only three-quarters full and uncovered, are heated by means of a current of 1,000 ampères and 50 volts for seven minutes. After the reaction the graphite cover is put on to prevent oxidation. After cooling, wash with cold water, then with hydrochloric acid. The carbide is then dissolved in aqua regia; filter through asbestos, and evaporate to dryness. The iron is removed from the residue, either by precipitating the ZrO_2 and FeS by means of sulphide of ammonium, and then dissolving the sulphide of iron with sulphurous acid, or by precipitating the sulphide of iron with sulphide of ammonium in the presence of tartaric acid. When treated with a current of chlorine, carbide of zirconium gives the anhydrous chloride, $ZrCl_4$, which dissolves in water, forming the oxychloride. This oxychloride can be obtained in a well-crystallized form by dissolving the chloride in hydrochloric acid. When heated to $100-110^\circ$ it becomes less soluble in water.—Chem. News, December 4, 1903, 282; from Ztschr. Anorg. Chem., 32 (1903), 81.

Aluminum—Method of Soldering.—According to a Danish patent, the following process is said to solder aluminum successfully: Clean the aluminum with hydrochloric acid, cover with potassium chloride and heat so that the upper surface is at about 900°C. , and the lower at 600°C. Allow to cool, then overlay with tin, and on re-heating at a temperature of a little over 300°C. the tin will solder or fuse with the aluminum.—Pharm. Journ., Jan., 1904, 117.

Aluminum.—Presence of large percentage in *Orites excelsa*, which see under "Materia Medica."

Kaolin—Advantages as an Absorbent and Aid in Filtration.—Walter T. Taylor recommends purified kaolin as superior to both precipitated calcium phosphate and purified talc as distributors of oil in the preparation of the official aromatic waters, the only possible drawback being that a larger quantity of kaolin is necessary than of either of the others. It possesses the advantage over the latter in separating so readily from the liquid, that when time is no object, the liquid may be allowed to become clear by subsidence, and filtration becomes unnecessary; while, if filtration is desirable, the filtrate will at once pass clear through a single layer of filter-paper. Consisting chiefly of silicate of aluminum, containing varying proportions of aluminum hydrate, ferric and magnesia oxides, and sometimes calcium carbonate, kaolin should be purified before use. In the presence of the latter it is to be treated with hydrochloric acid, and washed with water; if calcium carbonate is absent, it may be at once digested with dilute sulphuric acid, and then washed with water, which removes the iron, magnesia, and aluminum hydrate. These must be removed so as to render the kaolin suitable for the clarification of acid liquids.—Proc. La. Pharm. Assoc., 1903, 67-69.

Aluminum Sulphate—Compound with Sulphuric Acid.—E. Baud finds that when bauxite is acted upon by sulphuric acid diluted with its own volume of water, as in the case of the preparation of aluminum sulphate, after a definite time of heating a copious crystalline deposit is formed. This is evidently not ordinary aluminum sulphate, as it is not precipitated by sulphuric acid, and, also, it only dissolves with difficulty in cold water. If the bauxite is replaced by pure aluminum hydrate, the same phenomenon occurs. After purifying and drying, the substance is found to have the composition $\text{Al}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 4\text{H}_2\text{O}$. It dissolves very slowly in cold water, but more rapidly in hot. The formation of this compound is probably the result of three concurrent phenomena: partial dehydration of the aluminum sulphate, $\text{Al}_2(\text{SO}_4)_3 \cdot 16\text{H}_2\text{O}$, combination with sulphuric acid, and molecular modification.—Chem. News, Oct. 30, 1903, 220; from Compt. rend., 87 (1903), No. 13.

MANGANESE.

Manganese Alloys—Magnetic Properties.—Fr. Heusler has contributed

an interesting study on the magnetical properties of manganese alloys. Whereas both pure manganese and manganese-copper are known to be quite non-magnetic, the author has found that certain other manganese alloys are highly magnetizable even if copper or any other non-magnetical metals be added. The following list of metals and metalloids thus yielding more or less strongly magnetizable manganese alloys, free from iron, is given: Tin, aluminum, arsenic, antimonium, bismuth, boron. The most interesting results are derived from an investigation of manganese-aluminum-copper alloys, it being shown that keeping the latter for some time at a temperature of 110°C . will reduce them to a state of stable equilibrium, corresponding with the maximum susceptibility. It may further be inferred that for equal percentages of manganese the susceptibility will increase, as the percentage of aluminum is increased, until a maximum is reached corresponding with equal atomic percentages of both metals. It is an interesting fact that, according to Wiedemann, Quincke and Du Bois' researches, aqueous solutions of manganese salts should exhibit magnetical susceptibilities somewhat higher than those of the corresponding ferric salts. As both the salts and certain alloys of manganese, which itself is not at all ferro-magnetic, thus show strongly ferro-magnetic properties, the author compares these alloys with a salt solution where copper would play the part of solvent and the above combination of atomically equal quantities of manganese and aluminum that of the solved salt. The transition points beyond which the alloys become non-magnetical are relatively low; for increasing percentages of manganese and aluminum they are found to rise.—*Scient. Amer.*, 90 (1904), 227.

Manganese Dioxide—High Commercial Quality.—Willard Graham reports the results of assay of ten commercial samples of manganese dioxide, all of which tested from 20 per cent. to 25 per cent. higher than the U. S. P. requirement of 66 per cent., as is shown in the following figures: 92.5, 92.3, 86.1, 88.9, 90.6, 89.2, 92.9, 91.3, 93.8 and 92.9 per cent. MnO_2 .—*Proc. Pa. Pharm. Assoc.*, 1903, 225.

Manganese Salts and Oxides—Simplified Method of Titration.—Leon Débourdeaux points out that the titration of manganese oxides necessitates two determinations: (1) that of the chlorine which the oxide can set free; (2) that of the hydrochloric acid necessary to set free all the chlorine which is present. He finds that these two estimations, which usually need two distinct operations, can be effected in a single experiment by a method founded on the destruction of the superior oxides of manganese by hot oxalic acid in presence of suitably diluted sulphuric acid. This method has the advantage of needing very little attention. The two determinations of the titration take place rapidly and exactly in a single experiment. It is applicable to all manganese salts without previous elimination of the carbonates.—*Chem. News*, Feb. 12, 1904, 83; from *Compt. rend.*, 88 (1904), No. 2.

Manganese Salts—Oxidation by Alkaline Persulphates.—H. Baubigny finds that in neutral solution the oxidation of manganese salts by alkaline persulphates is stopped by the immediate formation of a brown color, which is accentuated by the action of heat. In acid medium, on the contrary, the action takes place less violently, especially if slowly heated, and at first a pale rose color appears like the ordinary coloration of permanganic acid. This disappears to give place to a brownish-black precipitate of oxide, the liquid above once more becoming slightly rose-colored.—Chem. News, July 31, 1903, 59; from Compt. rend., 86 (1903), No. 26.

Potassium Permanganate—Volumetric Solution for Oxidation Purposes.—John Lothian having previously recommended the adoption of potassium permanganate as an official (B. P.) volumetric solution for oxidation purposes, suggests that titration with permanganate might with advantage replace the gasometric methods for the determination of hydrogen dioxide and sodium nitrite. In the case of sodium nitrite Autenrieth recommends the titration to be carried out at a concentration of 1 : 1000. A measured quantity of the permanganate is placed in a flask, diluted, and the sodium nitrite solution slowly added from a burette, keeping the contents of the flask constantly swirled until decolorization is complete.—Pharm. Journ., April 30, 1904, 584.

IRON.

Iron—Separation from Aluminum by Formic Acid.—A. Lelère employs formic acid for the separation of iron and aluminum, as follows: The solution, acidified with sulphuric acid, is treated with ammonium formate and an excess of ammonium thiosulphate to keep the iron in solution in the ferrous state. On boiling the mixture, the aluminum is progressively and entirely precipitated as basic formate, mixed with a little sulphur. The precipitate is collected, moistened with nitric acid, calcined, and weighed in the form of alumina. The iron in the filtrate may then be precipitated in the warm solution by means of ammonium sulphhydrate.—Pharm. Journ., April 2, 1904, 466; from Compt. rend., 138, 146.

Iron—Causes and Preventives of Rusting.—G. T. Moody, in continuation of previous investigations of the causes of the rusting of iron, deals with this subject more particularly with reference to the influence of soluble substances. He finds that the salts of strong acids, such as sodium chloride and sulphate, potassium sulphate, ammonium sulphate, magnesium chloride and sulphate, calcium chloride and sulphate, and potassium chlorate have no retarding influence on rusting. These salts do not combine with and are not decomposed by carbonic acid. Compounds which inhibit rusting may be divided into two classes. The first contains substances having an alkaline reaction, such as sodium carbonate, hydroxide, phosphate and borate, ammonium carbonate, and barium and calcium hydroxides, all of which directly absorb and combine with carbonic acid.

The second class includes salts of weak acids, such as potassium and sodium nitrites, sodium formate, sodium acetate, potassium ferrocyanide and chromate. These salts are all decomposed by carbonic acid. Sodium nitrite solution, for example, after exposure to air becomes alkaline and contains sodium carbonate. A solution of 10 Gm. of the nitrite, through which a slow stream of carbon dioxide was passed for nine days, contained 1.585 Gm. of sodium carbonate. It may, therefore, be concluded that the influence of any particular compound on the atmospheric rusting of iron depends on its behavior towards carbonic acid, and that only those substances which combine with or are decomposed by carbonic acid, inhibit rusting. In the light of various experiments which are described, the aerial rusting of iron cannot be attributed to hydrogen peroxide, but must be regarded as a change involving the interaction of iron and acid and subsequent formation of rust by the oxidation of ferrous salt.—Pharm. Journ., Dec. 26, 1903, 944; from Proc. Chem. Soc., 271, 239.

Peroxides of Iron—Formation.—Manchot communicates the result of investigations on the formation of peroxides of iron, which were carried out on the basis of the following principles: A ferrous salt is submitted to the action of an oxidizing agent simultaneously with an acceptor. The acceptor is a body whose oxidation, very slow if it was the only reducing agent, is made very rapid by the simultaneous presence of the ferrous reducing agent. Under these conditions we observe both the oxidation of the ferrous salt and of the acceptor. If the latter is in excess, the oxygen that it uses up, added to that which has changed the ferrous salt to the state of ferric salt, gives the total oxygen taking part in the reaction, and furnishes the formula of the transitory peroxide which is formed. This oxide comes directly before the ferric degree. Using chromic acid as the oxidizer and hydriodic acid as the acceptor, we find that the primary oxide is Fe_2O_3 . The same is the case with permanganate and tartaric acid, and with H_2O_2 . Oxygen gas gives FeO , as the primary oxide. Hypochlorous acid gives FeO_3 . The ferric salts themselves are distinctly capable of peroxidation. Thus their presence accelerates the decoloration of indigo by oxidizing agents (less decidedly, it is true, than with the ferrous salts). The oxidizing action of dilute peroxide of hydrogen is prevented by the presence of acids. The oxides FeO , and Fe_2O_3 have not been isolated, but their existence as primary oxides does not seem the less proved by these experiments.—Chem. News, April 22, 1904, 203; from Liebig's Ann. Ch., cccxxv., 105.

Ferric Chloride—Volumetric Estimation with Sodium Hyposulphite.—If a solution of ferric chloride is warmed with sodium hyposulphite a reaction occurs, which is explained by the following equation:



This reaction only takes place on warming, but in the presence of copper

sulphate it proceeds in the cold. Taking advantage of this fact, Moreau employs the method for the titration of the official ("Codex," sp. gr. 1.26) solution of ferric chloride. 5 Gm. of this solution is treated with 2 Cc. of pure hydrochloric acid and made up to 80 Cc. with water; 10 Cc. of this dilution is measured off and diluted with 20 to 30 Cc. of water; about 0.1 Gm. sodium salicylate is then added, as an indicator, followed by 10 Cc. of 10 per cent. cupric sulphate solution. The mixture is then titrated with $\frac{N}{10}$ $\text{Na}_2\text{S}_2\text{O}_8$, added drop by drop; when the violet tint is nearly discharged, five seconds' interval is allowed between the addition of each drop of the reagent. The reaction is complete when the liquid is colorless or shows only the blue tint of copper. Each 0.1 Cc. of solution used gives the percentage of ferric chloride present.—Pharm. Journ., May 28, 1904, 744; from Bull. de Sciences Pharm., through Répertoire [3], 16, 170.

Ferric Chloride.—Efficiency in removing nicotine and other poisonous and undesirable components from tobacco smoke. See *Tobacco*, under "Materia Medica."

Ferrous Carbonate.—*Difficulties Encountered in Assay of Preparations*.—Experiments made and given in detail by F. X. Moerk in the assay of pill-mass and pills of ferrous carbonate show that it is impossible to determine accurately the quantity of ferrous carbonate in presence of organic excipients. The author also calls attention to a source of difficulty which may be experienced in titrating ferrous salts with potassium bichromate. In preparing a fresh solution of potassium ferricyanide for use as an indicator, the crystal should be washed several times with small quantities of distilled water until these washings give *only a brownish color* with a pure ferric salt, before making the solution; this is necessary to remove potassium ferrocyanide, which is produced by exposure of the ferricyanide to light and air.—Proc. Pa. Pharm. Assoc., 1903, 227-228.

Ferric Sulphate.—*Combination with Sulphuric Acid*.—According to A. Recoura, ferric sulphate combines very easily with sulphuric acid, producing an acid containing one molecule of each, which the author calls

Ferrisulphuric Acid. This acid is a light, white powder, very soluble in water, forming a pale yellow solution, and has the formula $\text{Fe}_2\text{O}_3\cdot\text{SO}_3\cdot\text{H}_2\text{O}$.—Chem. News, Aug. 14, 1903, 83; from Compt. rend., 87 (1903), No. 2.

CHROMIUM.

Chromium.—*Colorimetric Estimation*.—Cazeneuve proposes a colorimetric method for the estimation of chromium, which is based upon the intense purple-violet color reaction, previously described by him, produced when diphenylcarbazide is brought in contact with chromic acids or the chromates in general. Two solutions are necessary for this estimation: (1) A solution of diphenylcarbazide; (2) A titrated solution of chromic acid.

1. *Solution of Diphenylcarbazine*.—The solution of diphenylcarbazine is prepared in the following manner:

Diphenylcarbazine	2 Gm.
Alcohol at 90°	100 Cc.
Acetic acid	10 Cc.

Boil on the water-bath until completely dissolved, and make the volume up to 200 Cc. with alcohol at 90°.

2. *Chromic Solution*.—Weigh out 0.5 Gm. of pure chromic acid, dissolve it in a little water, and make up the volume to 1000 Cc.; take 100 Cc. of this solution, place them in a graduated liter flask, and make up to 1000 Cc. with distilled water; thus we have a solution of which each Cc. represents 0.00005 Gm. of chromic acid, or 0.000026 of chromium.

Having weighed out 0.25 to 0.50 Gm. of the sample, for instance, chrome iron, according to the supposed properties of chromium present, this is dissolved and transformed into chromate by one of the known methods. With the filtered alkaline solution thus obtained, diluted to 100 Cc. or 200 Cc., according to circumstances, and neutralized exactly with acetic acid, the test is carried out as follows: Measured volumes of the solution, in serially increasing quantities, are added to 2 Cc. of the diphenyl-carbazine solution diluted to 70 Cc., and then brought to 100 Cc. in graduated test-glasses, and the color produced is compared with a series of liquids freshly prepared in the same way with 0.5 Cc., 1.0 Cc., 1.5 Cc. and 2.0 Cc., etc., of the titrated chromic acid solution. The amount of chromium is then deduced from the volumes of the two chromic liquids consumed in the two opposite solutions in which the tints are found equal.—Chem. News, June 3, 1904, 268; from Bull. Soc. Chim. (3), xxxi., No. 6.

COBALT AND NICKEL.

Cobalt and Nickel Salts—Distinctive Reactions.—G. Guérin states that if a solution of a cobalt salt is precipitated by excess of caustic potash and then treated with an excess of iodine in potassium iodide, after a few moments the whole of the cobalt is precipitated as a black hydrated sesquioxide. Nickel gives a light green hydroxide. The same behavior is shown by cobalt and nickel when already precipitated by other radicals, except when precipitated as ferricyanides. In this case the potash alone produces a black precipitate of cobalt hydrated sesquioxide.—Pharm. Journ., March 26, 1904, 428; from Journ. Pharm. Chim., 19 (1904), 139.

ZINC.

Zinc Oxide—Test for the Possible Presence of Nitrate.—Dr. Richard Witte directs attention to the presence of zinc nitrate in a sample of oxide of zinc, which had in other respects responded to the demands of the Ph.

Germ. IV. for zincum oxydatum pur., and particularly in being free from more than the allowable quantity of the sulphate. The presence of zinc nitrate was indicated by the evolution of brown vapors on heating the sample in a dry test-tube, and subsequent tests confirmed its presence. It appears evident that in this case the zinc carbonate—which by subsequent heating is reduced to oxide—was not, as is customary, prepared from zinc sulphate, but from zinc nitrate, this being possibly a by-product of the manufacture of some other preparation. In view of this observation the author considers it important that the pharmacopœial tests for impurities in zinc oxide, intended for internal use, should include a test for the presence of nitrate, such a test being conveniently carried out as follows: The sample having been dissolved in water (1 : 20) by the aid of sulphuric acid, this solution of zinc sulphate is superimposed on a layer of concentrated sulphuric acid (2 Cc.) containing a few drops of diphenylamine solution (1 Gm. in 100 Gm. con. sulphuric acid). In the presence of nitrate a dark-blue zone will develop at the point of contact of the two solutions. Apoth. Ztg., 18, No. 52 (July 1, 1903), 450.

Zinc Peroxide—Composition.—According to Kuriloff the composition of zinc peroxide is analogous to cadmium peroxide and corresponds to the formula $\text{Mo}_2\text{M}(\text{OH})_2$. The author asserts that this latter formula is the only one definitely established up to the present time, the other types not having been verified. After establishing the individuality of the different degrees of oxidation, it will be possible to definitely settle the question as to the characteristics of these peroxides and compare them with the peroxides of barium, strontium, and calcium.—Chem. News, Nov. 20, 1903, 256; from Compt. rend., 87 (1903), No. 16.

Zinc Peroxide—Various Forms and Characters.—De Forcrand has made a series of experiments on the peroxide of zinc, by which he proves the existence of a compound $\text{ZnO}_{1.76} + \text{H}_2\text{O}$ or $\text{Zn}_4\text{O}_7 + 4\text{H}_2\text{O}$, which corresponds to one limit; then a very unstable compound $\text{ZnO}_{1.88} + 2$ or $2.5\text{H}_2\text{O}$; the degree of oxidation of this compound approaches very near to ZnO_2 . Finally, by the action of heat on these former substances he isolates $\text{ZnO}_{1.88} + \text{H}_2\text{O}$ or $\text{Zn}_3\text{O}_5 + 3\text{H}_2\text{O}$, and $\text{ZnO}_{1.88} + 0.66\text{H}_2\text{O}$ or $\text{Zn}_3\text{O}_5 + 2\text{H}_2\text{O}$. At 190° and 210°C. , respectively, these two compounds suddenly decompose, giving an almost anhydrous protoxide without intermediate products.—Chem. News, Febr. 19, 1904, 95; from Compt. rend., 88 (1904), No. 3.

Zinc Sulphate—Manganese as Impurity.—Manganese has hitherto not been mentioned among the probable impurities in zinc sulphate. In a sample recently examined by D. B. Dott, the presence of manganese was suspected from the color of the ammonium sulphide precipitate, and on testing with the borax and sodium carbonate beads, the production of the amethyst and green colors, respectively, confirmed its presence. Further

tests and experiments showed it to be present in the sample in an amount equal to 4.05 per cent. of crystallized manganese sulphate.—Pharm. Journ., April 30, 1904, 587.

THALLIUM.

Thallium—Iodometric Estimation.—E. Rupp finds that exact results can be obtained with the volumetric estimation of thallium in form of chromate, proposed by Browning and Hutchins, by proceeding as follows: Take 10 or 20 Cc. of a 5 per cent. solution of chromate of potassium, in which the proportion of CrO_3 is known exactly, and place them in a 50 or 100 Cc. beaker, with an equal quantity of water, and 1 or 2 Gm. of carbonate of lime. To this solution we add the solution of the salt of thallium, which should be neutral, and should not contain more than 0.1 Gm. of thallium. We then make the liquid up to a known volume, leave it to stand for thirty minutes, throw on a filter and estimate the excess of CrO_3 in an aliquot part of the filtrate (about 20 to 50 Cc.). To effect this, dilute to 100 Cc., add 10 or 15 Cc. of 25 per cent. hydrochloric acid, then 1 Gm. of iodide of potassium; let stand for five minutes, and titrate with hyposulphite. By making the same estimation on the original chromate solution, we obtain, by difference, the chromic acid utilized for the precipitation of the thallium. The number of Cc. of decinormal hyposulphite corresponding to this chromic acid, $\times 0.01362$, gives the amount of thallium.—Chem. News, Jan. 8, 1904, 24; from Zeit. Anorg. Chem., vol. xxxiii., p. 156.

COPPER.

Copper—Iodometric Estimation by Means of Potassium Xanthate.—E. Rupp and L. Krauss propose a method for the iodometric estimation of copper which depends on the precipitation of the copper as xanthate and the estimation of the excess of xanthate by iodine. The reagent may be prepared by dissolving potassium xanthate in water (2.5 : 100.0), clarifying the solution by the addition of a little copper sulphate, filtering off the precipitate and establishing the titre as follows: Add to a known volume of this solution some sodium bicarbonate and starch emulsion, then run in decinormal iodine until the blue color persists for ten to twenty seconds. The estimation of copper is then effected with this reagent as follows: The cupric solution, if acid, is treated with sodium acetate, a known volume of the xanthate solution is run in, followed by sodium bicarbonate (to neutrality? Rep.). The mixture is diluted, filtered, and the excess of xanthate estimated in an aliquot part of the filtrate by decinormal iodine solution in the manner above explained. Two molecules of xanthate correspond to two molecules of iodine and to one of copper. The results are accurate to about 0.5 per cent.—Chem. News, June 10, 1904, 288; from Berichte, xxxv., 4157.

Copper Sulphate—Direct Preparation from Ores.—Gustav Gin observes that the usual method adopted for the manufacture of sulphate of copper, depending on the direct attack of copper or its binocide by sulphuric acid, is profitable only when the production of this salt is simply in consequence of other metallurgical operations of greater importance; for example, in the separation of the precious metals alloyed with copper. Modern demands, however, require a more direct source, and these have obliged operations, such as melting, refining, granulation, and oxidation, which are costly and circumstantial. To remedy these imperfections the author has endeavored to find a process for the commercial production of sulphate of copper, starting directly from the sulphurized ores, or from poor matter, and without submitting the metal to any intermediate preparation, and he has succeeded in devising such a process, which has proven perfectly satisfactory. The ore or matte, suitably broken up, is subjected to an oxidizing roasting in a muffle furnace, sufficiently prolonged to transform the whole of the sulphide of copper into oxide or sulphate. It is then removed to the floor of a cooling chamber, through which the sulphurous gases from the oxidization of the sulphur and dissociation of the sulphate are passed after mixing with a suitable amount of air. These gases move with the ore, which is gradually shovelled towards the other end of the cooling chamber opposite to the roasting furnace, and in its passage the copper content is completely converted into sulphate by the sulphuric anhydride produced from the sulphurous anhydride contained in the gases, while the iron oxide present is partially converted into a basic sulphate after the conversion of the copper into sulphate has been completed. The sulphated ore is then subjected to a methodical lixiviation, yielding hot concentrated solutions, which are digested hot with ore that has been roasted *sweet*, and contains, consequently, the whole of the copper in the state of binocide. The ferric sulphate present sulphates the copper, while the iron is precipitated in the state of peroxide, thus leaving relatively pure copper alone in solution. The final purification is then readily accomplished by a method of recrystallization which is described in detail, the mother liquors coming again into circulation for the production of fresh solutions—the entire process, from the roasting of the ore to the recrystallization of the salt, being continuous.—Chem. News, July 31, 1903, 54, 55; from Proc. Fifth. Internat. Chem. Congress, Berlin, 1903.

URANIUM.

Uranium Nitrate—A Useful Alkaloidal Reagent.—According to J. Alvy, uranium nitrate gives precipitates with most alkaloids, the exceptions among the large number examined being caffeine, theobromine and asparagine. The reagent is used in 5 per cent. solution. With morphine it produces a characteristic red color, which is developed with as little as 0.005 Gm. of the base, while with smaller quantities an orange-yellow pre-

cipitate is produced. More or less intense yellow precipitates are also produced with 0.0001 Gm. of pyridine, narcotine, papaverine, codeine, thebaine, brucine, strychnine, quinine, cinchonine, cinchonidine, cocaine, aconitine, atropine, coniine, and pelletierine—these bases being regenerated on treatment of the precipitate with alkaline bicarbonate.—Pharm. Journ., Sept. 19, 1903, 431; from Bull. Soc. Chim., 29, 610.

Uranium—New Compounds.—Using the double chloride of uranium and sodium as the most suitable basis for his various manipulations, A. Colani has prepared and describes a number of uranium compounds which have not hitherto been obtained or accurately described. Thus,

Uranium Sulphide, US , is readily obtained in form of large square tablets, by heating uranium and sodium chloride between 500° and $1000^{\circ}C.$, in a current of hydrogen sulphide, observing that the latter be perfectly dry, since US is readily decomposed by water at a red heat. The same sulphide may also be obtained by heating the double chloride with an alkaline monosulphide.

Uranium Selenide, USe , results in extremely slender crystals when hydrogen selenide is used under the same condition in the place of hydrogen sulphide. If prepared at too low a temperature, the selenide is pyrophoric.

Uranium Telluride, UTe , is obtained in the form of large, very brilliant scales, by passing tellurium vapor in a current of hydrogen over the uranium-sodium chloride heated to $1000^{\circ}C.$, but better results were obtained by fusing the double salt with sodium telluride, black quadratic tablets of UTe , with brilliant lustre, being thus formed.

Uranium Nitride, U_3N_2 , which has previously been obtained, is easily obtained by heating the double salt in gaseous ammonia, and dissolving out the sodium chloride. The resulting nitride is a crystalline powder of metallic aspect.

Uranium Phosphide, U_3P_2 , which does not readily fuse by heating the double salt in PH_3 , is obtained as a black crystalline powder by fusing the double salt with aluminum phosphide in a current of hydrogen, and treating the fused mass consecutively with water, dilute hydrochloric acid, and ether. The product is slightly contaminated with alumina.

Uranium Arsenide, U_3As_2 , is obtainable in well-formed square tablets by the action of K_3As on the double salt, but

Uranium Antimonide, of composition U_3Sb_2 , has not been obtainable by any process that has been tried. By fusing the double salt with excess of antimony and aluminum, a white alloy is obtained, which, when fused in a Leclerc's furnace in a current of hydrogen, parts with a portion of its antimony without, however, attaining the formula U_3Sb_2 .

These compounds of uranium with the metalloids burn with difficulty in the air, but they give brilliant sparks when thrown into the flame of a

Bunsen burner. They are violently attacked by strong nitric acid.—Pharm. Journ., Sept. 12, 1903, 402 ; from Compt. rend., 137, 382.

LEAD.

Lead—Emanations from Fresh Faints.—T. L. Breton satisfactorily demonstrates that fresh paints containing lead do give off plumbic emanations, which may have grave effects on the health of those persons breathing them, and he consequently believes that from a hygienic point of view zinc paints should in all possible cases be substituted for lead paints.—Chem. News, July 17, 1903, 35 ; from Compt. rend., 86 (1903), No. 24.

Lead Dioxide—Use in Analysis.—St. Bogdan makes use of lead dioxide for the removal of the excess of ammonium sulphide present in solutions after precipitation, as sulphides, of the metals which are not precipitated by hydrogen sulphide in acid solution. On adding powdered lead dioxide to such a solution, the ammonium sulphide is decomposed, ammonia being liberated, and lead sulphide and sulphur precipitated. The reaction takes place in the cold, but it is desirable to heat on the water-bath for a few minutes. The precipitate does not retain any salts of alkaline earths which may be present, and the filtered solution is ready, without the addition of ammonia, for testing for the metals of the alkaline earths.—Pharm. Journ., Aug. 29, 1903, 325 ; from Bull. Soc. Chim., 29, 594.

Minium—Conditions of Formation.—In the course of a study on the chemical action of sunlight on metallic bodies, George Kassner followed up experimentally the influence of sunlight and air for a prolonged period upon the yellow lead oxide with the object of arriving at an explanation of the process and possibly gaining other data of interest in photo-chemical investigations. He found that under the conditions named the lead oxide is converted into a body of red color which, when freed from excess of oxide in admixture corresponds in its composition to a basic minium and a composition which places it between Pb_3O_6 and Pb_6O_7 . As a result of his comprehensive experiments he concludes that by the simultaneous action of light and oxygen on lead oxide at the ordinary temperature, the latter is oxidized to plumbate, which by prolonged action acquires a composition approximating to minium. The oxidation of the lead oxide under the influence of sunlight is traceable to the enclosure of free oxygen atoms and presumably in consequence of the ionization of the atmospheric oxygen by the light. This oxidation of lead oxide under the influence of sunlight, moreover, must be regarded as a phenomenon, fundamentally of a different nature than the processes of oxidation by inactive oxygen, designated as auto-oxidation, whereby in primary reaction entire molecules of oxygen are enclosed in the oxidizable substance, and in which activity frequently follows as a secondary reaction. In consequence of its lucidity and the freedom from disturbing secondary reactions, the process of the oxidation of lead oxide under the influence of sunlight appears to be

calculated to supply a point of departure for a consistent explanation of the chemical action of light.—Arch. d. Pharm., 241, No. 9 (Dec. 15, 1903), 696-708.

MOLYBDANUM.

Molybdic Acid.—A Sensitive Color Reagent for *Tannin*, which see under "Organic Chemistry."

Molybdic Acid.—*Sensitive Reaction with Tannin.*—Emm. Pozzi-Escot finds that when a few drops of a solution of tannin are added to a solution of molybdic acid an orange solution is formed, becoming cherry-red in strong solution and yellow in dilute solution. This coloration constitutes a very sensitive test for molybdic acid, even showing with $\frac{1}{100000}$ part of ammonium molybdate in solution.—Chem. News, Feb. 26, 1904, 106; from Compt. rend., 88 (1904), No. 4.

Molybdic Acid—Characters and Salts.—According to the researches of F. Mylius, there is no hydrate of molybdic acid corresponding to orthotelluric acid, $\text{Te}(\text{OH})_6$, the white milky precipitates of molybdic acid are badly defined. The colorless molybdic acid in aqueous solution corresponds in its properties generally with allotelluric acid. On the other hand, there is a yellow molybdic acid, $(\text{MoO}_3\text{H}_4)_x$, which is formed slowly by the action of nitric or hydrochloric acid on solutions of the alkaline molybdates, or of white molybdic acid. An acid molybdate of ammonium, $\text{NH}_4\text{MoO}_3 \cdot 6\text{H}_2\text{O}$, has been prepared which, on being heated, first loses half its ammonia and its water; if heated more strongly, the residue becomes green as a result of reduction. This salt is deposited in small colorless needles by the addition of NO_3H , HCl , or SO_3H , in quantities calculated from the solution of ordinary ammonium molybdate; the white cheesy molybdic acid is first formed, and this becomes gradually changed. This salt is slightly soluble in cold water, easily soluble in hot water, but at about 60°C . the solution changes, giving a deposit of a less hydrated insoluble salt. It has a very acid reaction, and decomposes the carbonates. It precipitates albumen; its solution is not precipitated immediately by nitric acid; eventually it forms still more acid salts, or the yellow acid.—Chem. News, October 2, 1903, 173; from Berichte, xxxvi., 638.

VANADIUM.

Vanadic Acid.—*Use of its Solutions as an Antiseptic.*—Le Blond and C. David find that solutions of vanadic acid act as excellent antiseptic dressings for simple wounds, anthrax pustules, tuberculous lesions, syphilitic sores, eczema, and soft chancres. For skin affections the strength of the solution employed was 0.05 in 1,000; for gynaecological use, and where a stronger stimulant reaction was required 0.17 in 1,000 was used. Urethritis has been cured with the weaker solution in three weeks; endometritis

was generally cured in the same time—where this was not the case the stronger solution was used. In addition to its antiseptic action, vanadic acid has a powerful healing influence, which renders it specially valuable in treating skin affections. It is most valuable in gynecology, being superior to the antiseptics generally used, and having the great advantage of being odorless.—Pharm. Journ., May 28, 1904, 751; from Bull. Gén. de Therap., 145, 851.

Vanadium—Estimation in Alloys.—The methods employed for the estimation of vanadium are either very tedious or not very accurate. Paul Nicolardot now recommends a modification of Sefström's method for the detection of vanadium in iron, for which he claims accuracy and fair rapidity in quantitatively estimating it in alloys. The method is based upon the fact that steels and irons, containing vanadium, when attacked by sulphuric or hydrochloric acid leave a black residue consisting chiefly of graphite and silica, and containing all the vanadium in the sample. If all chance of oxidation is removed, the vanadium remains behind in the metallic state, no trace of this metal being found either in the dissolving liquid nor in the gaseous products evolved.—Chem. News, July 24, 1903, 46; from Compt. rend., 86 (1903), No. 25.

BISMUTH.

Bismuth—Determination as Molybdate.—H. R. Riederer suggests, as preferable to the usual method of determining bismuth, a volumetric method depending on its precipitation as molybdate. When a solution of ammonium molybdate in nitric acid is added to a nitric acid solution of bismuth nitrate, and the whole is neutralized with ammonia, all the bismuth is precipitated as a molybdate in a finely flocculent form. The precipitate, after heating and washing with ammonium sulphate solution, is dissolved in dilute sulphuric acid and run through a Jones reductor with suction; after this, it is strongly acidified with sulphuric acid and immediately titrated with standard potassium permanganate. A number of details in manipulation require to be observed; for these the original paper must be consulted.—Pharm. Journ., Oct. 17, 1903, 548; from Journ. Amer. Chem. Soc., 25, 907.

Bismuth—Iodometric Estimation in the Form of Chromate.—E. Rupp and B. Shaumann find that the method described by Mohr, in his Treatise on Analysis, for the volumetric estimation of bismuth, does not give satisfactory results. This method, which consists of precipitating the bismuth by means of $\text{Cr}_2\text{O}_7\text{K}_2$, collecting the chromate of bismuth and titrating it with ammoniacal sulphate of iron, can be made perfectly exact by operating as follows: The solution of bismuth containing the smallest possible quantity of free acid is poured into a known volume of a titrated solution of CrO_5K_2 (at about 5 per cent.). The solution is then diluted, shaken energetically, and after ten minutes it is filtered. After making

certain that the whole of the bismuth is precipitated, the excess of CrO_3 is estimated in a portion of the filtrate, by means of $\text{KI} + \text{SO}_4\text{H}_2$; the iodine set free is then titrated by means of $\text{S}_2\text{O}_3\text{Na}_2$.—Chem. News. March 18, 1904, 143; from Zeit. Anorg. Chem., xxxii., 359.

Bismuth—Colorimetric Determination.—Plauès has devised a colorimetric method for determining bismuth, which is dependent on the following observation: If an acid aqueous solution of bismuth be treated with a solution of potassium iodide, a brown precipitate of bismuth iodide is produced. If, however, the bismuth solution is added to the potassium iodide an orange-yellow coloration is produced, and it is only on adding an excess of the bismuth solution that a precipitate of bismuth iodide is formed. Plauès has found that the formation of a precipitate is in both cases entirely prevented by the addition of glycerin. Moreover, if the glycerin be present in large amount it prevents the formation of basic salts of bismuth, thus permitting the use of feebly acid solutions. For the colorimetric determination of bismuth two standard solutions are necessary—(1) a strongly glycerinated solution of bismuth; (2) a similar solution of potassium iodide. 1 Gm. of pure bismuth is dissolved in a mixture of 3 Cc. of pure nitric acid (sp. gr. 1.39) and 2.8 of water, according to the method of the French Codex, and the solution made up to 100 Cc. with glycerin. 5 Gm. of potassium iodide is dissolved in 5 Cc. of water, and made up to 100 Cc. with glycerin. This solution must be protected against the light. In applying the method to commercial samples, the solutions compared should contain approximately the same amounts of bismuth.—Pharm. Journ., Dec. 26, 1903, 944; from Journ. de Ph. Chim., 18, 385.

Crystallized Bismuth Salts—Preparation and Characters.—A. de Schulten has succeeded in preparing and has examined some crystalline subnitrate of bismuth, and the crystallized phosphate and arsenate of that metal, limiting the field of his inquiry on the subnitrate to the crystalline compounds which are produced by the action of water in the cold on a solution of nitrate of bismuth in nitric acid. The

Bismuth Subnitrate, $5\text{Bi}_2\text{O}_3 \cdot 5\text{N}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$, was obtained by dissolving 50 Gm. of the salt $\text{Bi}(\text{NO}_3)_3 + 5\text{H}_2\text{O}$ in 50 Cc. of nitric acid of 1.2 density and adding 3 liters of water while stirring, collecting the crystals produced after 12 hours, very carefully pressing them between filter-paper, and drying in air until their weight no longer changed. The crystals so obtained had the composition indicated by the above formula. They have a pearly lustre, take the form of very thin plates, which are hexagonal, often slightly elongated, and are striated parallel with the elongation. The density of the crystals was found to be 4.928 at 15°C . When placed on sulphuric acid they lose 3.14 per cent, corresponding to 5.27 molecules of water. They dissolve in water, and the solution deposits crystals of the

Bismuth Subnitrate, $5\text{Bi}_2\text{O}_3 \cdot 4\text{N}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$, which may also be obtained

in well-crystallized form by adding water to the mother liquors of the preceding salt, no other compound than this being obtainable no matter what quantity of water may be added. These crystals are not attacked by water, and they do not undergo any change in free air or even sulphuric acid. They are limpid and brilliant, monoclinic, rectangular tablets, up to 1.6 Mm. in length, 0.3 Mm. in width, and 0.03 Mm. in thickness, and have a density of 5.290 at 15° C.

Phosphate of Bismuth, BiPO_4 , was obtained by dissolving in a large flask 15 Gm. of $\text{Bi}(\text{NO}_3)_3 + 5\text{H}_2\text{O}$ and 7 Gm. of $\text{HNa}_2\text{PO}_4 + 12\text{H}_2\text{O}$, in concentrated nitric acid and a little water, heating the solution on a water-bath, and allowing water to fall into it very slowly, drop by drop. After some time the microscopic crystals were collected, and found to have the composition indicated by the above formula. They were limpid and brilliant monoclinic prisms, elongated, and terminated by hemipyramids. Their density was found to be 6.323 at 15° C. In a similar manner, substituting for the phosphate disodic arsenate, or arsenic acid, in equivalent amount, the

Arsenate of Bismuth, BiAsO_4 , is obtained. The microscopic crystals are in the form of monoclinic prisms, terminated by hemipyramids, the elongation being negative. Their density was found to be 7.142 at 15° C.—Chem. News, Feb. 19, 1904, 87; from Bull. Soc. Chim. (3), xxix, No. 14.

TELLURIUM.

Tellurium—Allotropism.—D. Biéliankine has observed that tellurium precipitated from an alkaline solution, and considered by Berthelot to be amorphous, has a density greater than that of the tellurium precipitated from an acid solution by sulphurous acid; these two modifications have not the same appearance. The tellurium precipitated by sulphurous acid is a very finely-divided, black, amorphous powder; the tellurium precipitated by the addition of water and the cooling of a concentrated boiling alkaline solution, is a dark-looking powder containing a number of silvery-looking flakes formed of microscopic rhombohedra. It may be admitted, therefore, that of the three modifications observed by Berthelot, one is amorphous and the other two crystalline. These different forms have variable densities as exhibited by the figures given by the author.—Chem. News, July 10, 1903, 24; from Journ. Soc. Phys. Chim. R., 33, 670.

Tellurium—Gravimetric Estimation by Means of Hypophosphorous Acid.—A. Gutbier finds that even with very dilute solutions of telluric acid, hypophosphorous acid gives a brownish-blue coloration, and thus enables us to detect tellurium qualitatively in solutions which do not contain the heavy metals, and which are free from sulphuric or nitric acids; on the other hand, the presence of hydrochloric acid facilitates the reaction. For the quantitative estimation of tellurium, the solution is treated with its own volume of hypophosphorous acid (a 50-per cent. solution). Heat

until the liquid, which is at first brown or blue in color, becomes completely limpid. The precipitated tellurium is dried at 105°C . until the weight is constant. Instead of 55.57 and 79.95 of tellurium, the author obtained figures comprised between 55.20–55.82 and 79.84–80.05.—Chem. News, Mar. 18, 1904, 143; from Zeit. Anorg. Chem., xxxii., 295.

Tellurium—Quantitative Separation from Antimony.—A. Gutbier calls attention to two new methods for the quantitative separation of tellurium and antimony, as follows:

I. *Separation by Means of Hydrate of Hydrazine.*—The solution should be a hydrochloric one, and free from sulphuric and nitric acids. To the slightly acid solution we add a large excess of tartaric acid and an excess of dilute solution of hydrate of hydrazine. The tellurium is precipitated; the antimony remains in solution. The latter is boiled with concentrated hydrochloric acid, diluted with warm water, and precipitated with hydrogen sulphide. Instead of the hydrate of hydrazine we might use the hydrochloride, but not the sulphate. The separation is quite general. The antimony and the tellurium might be precipitated first of all as sulphides, and these subsequently oxidized with nitric acid or aqua regia.

II. *Separation by Means of the Hydrochloride of Hydroxylamine.*—This, devised in collaboration with F. Resenschek, has already been suggested by Jannach and Müller, and is effected in a strongly ammoniacal solution. The solution containing the chlorides is treated with a large excess of tartaric acid, and then with 1 or 2 Gm. of solid hydrochloride of hydroxylamine. When the precipitate has settled it is filtered, and the antimony is estimated in the solution as above. It must first be ascertained that the whole of the tellurium has been precipitated. The two methods give good results, but we do not strongly recommend the precipitation by hydrochloride of hydroxylamine, on account of the loss of time it occasions.—Chem. News, Mar. 31, 1904, 168; from Ztschr. Anorg. Chem., xxxiii., 260.

ARSENIC.

Arsenic—Determination of Minute Traces.—A. Gautier, in search of a reliable reagent for determining minute traces of arsenic, has succeeded in preparing such as follows: 100 Gm. of commercial ferrous sulphate is dissolved in 500 Cc. of water containing 25 Gm. of pure sulphuric acid; the solution thus obtained is treated with hydrogen sulphide, boiled, filtered, and oxidized with 28 Gm. of nitric acid. The ferric hydrate is then precipitated with arsenic-free ammonia, washed and dissolved, in the cold, in dilute pure sulphuric acid. This ferric sulphate still contains traces of arsenium. These are removed by digesting it for two days with arsenic-free granulated zinc, heating it to boiling *in vacuo*. The solution is again oxidized with a little nitric and sulphuric acids, and the ferric hydrate precipitated with an excess of pure ammonia, which redissolves the zinc

hydrate. After washing, the ferric hydrate is redissolved in pure dilute sulphuric acid, and diluted so that it contains 30 Gm. Fe_2O_3 in 100 Cc. This quantity will not contain more than 0.0005 Mgm. As_2O_3 . The reagent thus prepared will precipitate the most minute trace of arsenium. Distilled water containing 0.0011 Mgm. As_2O_3 per liter, was found, after boiling with 5 Cc. of this reagent, and precipitation with ammonia, to be absolutely free from arsenium. It is also available for the detection of minute quantities of arsenium with great accuracy, in quantities from 1 Mgm. to 0.001 Mgm. in any substance. By its means the existence of 0.001 Mgm. of arsenic per liter has been demonstrated in distilled water, and to the extent of 0.1 Mgm. per liter in so-called pure ammonia. In the detection of traces of arsenic in physiological or toxicological analyses, after charring the organic matter, as previously indicated, with a mixture of nitro-sulphuric acid, the carbonaceous mass is extracted with boiling water, filtered, partially neutralized, and a little of the ferric sulphate reagent added, so that the mixture does not give a reaction with ferrocyanide. The precipitate formed in this partially neutralized liquid does not contain any arsenium. It is removed by filtration, the filtrate treated with 5 Cc. more of the reagent, boiled, and neutralized with ammonia. The precipitate thus obtained is collected, redissolved in a mixture of pure nitric and sulphuric acid, heated until no more nitrous fumes are evolved, diluted with water, and introduced directly into the Marsh's apparatus.—Pharm. Journ., Oct. 25, 1903, 577; Compt. rend., 137, 158.

Arsenic—Presence in Reagents.—The extreme delicacy of the ferric sulphate reagent as a precipitant for arsenic has enabled Gautier to demonstrate the presence of that body in most of the purest reagents. Thus, distilled water obtained from a tinned copper still, treated previous to distillation with 1 : 1000 Na_2CO_3 , contained 0.0007 Mgm. of arsenic per liter; the same distilled from a glass retort, over 1 : 1,000 pure NaHCO_3 , gave 0.0011 Mgm. per liter. So-called pure commercial solution of ammonia contained 0.0010 Mgm. per 100 Cc. Solution of ammonia, made with pure potassium sulphate, and reputed pure caustic soda, gave 0.0033 Mgm. per 100 Cc. Commercial sodium bicarbonate, 0.016 Mgm. per 100 Gm.; pure commercial potassium nitrate, 0.0015 per 100 Gm.; reputed pure potassium sulphate, 0.006 per 100 Gm.; purified ferric sulphate, containing 30 Gm. Fe_2O_3 per liter, 0.0004 Mgm. per 100 Cc.; specially purified nitric acid, 0.00023 Mgm. in 100 Gm.; saturated solution of SO_2 in water, 0.005 Mgm. in 100 Cc. Hydrogen sulphide generated and purified in the usual manner, contained considerable quantities of arsenic. When purified in a special manner, which will be described by the author, it contained but the minutest trace.—Pharm. Journ., Nov. 7, 1903, 661; from Compt. rend., 137, 236.

Arsenic—Occurrence in Sea Water, Mineral Water, Rock-salt, and Common Salt.—By means of the ferric sulphate reagent, Gautier has also

been able to demonstrate the presence and determine the minute amount of arsenic in sea water, mineral waters, rock-salt, and common salt. Sea water from the Atlantic, 30 kilometers from the Brittany coast, was found to contain 0.009 Mgm. of inorganic arsenic, and about 0.0008 Mgm. of organic arsenic per liter. Another determination gave 0.010 Mgm. of total arsenic per liter. From deep-water soundings off the Azores a sample taken at a depth of 10 M. contained 0.025 Mgm. of arsenic per liter; at a depth of 1,335 M. 0.010 Mgm. per liter, and at a greater depth of 5,943 M., or 6 or 8 M. from the bottom of the ocean, 0.085 Mgm. of arsenic per liter. It is apparent, therefore, that arsenic abounds in the water at great depths in volcanic regions. The water of a salt spring at Misserey, near Besançon gave 0.010 Mgm. of arsenic per liter. Fine sea-salt from Brittany gave 0.003 Mgm. of arsenic per 100 Gm., the same from Olonne, 0.001 Mgm., grey sea-salt from Olonne, 0.045 Mgm.; English table-salt, 0.015 Mgm. Rock-salt from Stassfurth contained 0.0025 Mgm. of arsenic per 100 Gm. of salt; from near Nancy, 0.005 Mgm.; mountain salt from Djebel-Amour, South Oranais, 0.005 Mgm.; fused sodium chloride of unknown origin, 0.030 Mgm.; salt from a volcanic fissure on Vesuvius, 0.175 Mgm. Arsenic is, therefore, invariably present in salt. Vichy water from various wells was found to contain from 0.12 to 0.31 Mgm. of arsenic per liter.—Pharm. Journ., Nov. 14, 1903, 701; from Compt. rend., 137, 229.

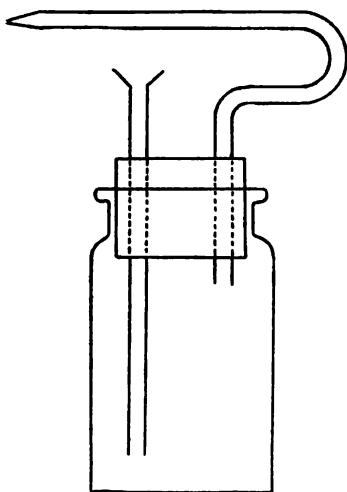
Arsenic—Determination in Beer.—W. Thompson describes a method of approximately determining minute quantities of arsenic in foods and liquids, which in its essentials is a modification of the Marsh-Berzelius process, in which the arsenic passes as gas in combination with hydrogen. The modification consists in the cooling of the tube on which the "mirror" has deposited, and heating the portion immediately before it as intensely as possible. In this way a very distinct arsenic "mirror" is obtained with as little as a sherry-glassful of beer containing the $\frac{1}{2000}$ th part of a grain per gallon, and it is claimed that the presence of as little as 1 grain of arsenic trioxide in 4000 gallons of beer can by this means be detected. The arsenic is deposited either as a bright brown metallic "mirror" or as a black deposit; but while the deposit in the metallic form affords the best means of determination, arsenical deposits are liable to fade if exposed to light, an effect which the author believes to be due to the absorption of the metal in the hydrogen with which the tube is filled, this resulting under the influence of light.—Pharm. Journ., 71, 3389 (Oct. 3, 1903), 481; from Proc. Brit. Assoc., 1903.

Arsenic.—Purification of *Sulphuretted Hydrogen* to be used for its estimation, which see under "Sulphur."

Arsenic—Simple Apparatus for Marsh's Test.—Dr. George F. Barksdale describes in detail the method of constructing the simple apparatus shown by Fig. 61 for applying Marsh's well-known test for arsenic. A

tube one-fourth inch in diameter and twelve inches long is bent as shown, the nozzle being constricted in the flame. It is inserted into a good cork, accurately fitting a two or three ounce bottle, through one of the two holes, so as to extend just beneath the cork, the second hole bearing a small funnel tube which reaches to near the bottom of the bottle. Explicit

FIG. 61.



Apparatus for Marsh's Test.

directions are given for securing a proper bend in the delivery tube, which must, however, be consulted in the original if necessary.—*So. Drug. Journ.*, January, 1904, 206.

Arsenic—Action of Water and Dilute Caustic Soda Solutions.—W. T. Cooke has made experiments with the view of ascertaining: (1) whether water alone has any action on either variety of arsenic, (2) whether the action, if any, is increased by the presence of caustic soda, (3) and whether, in the presence of air, the crystalline variety dissolves to a greater extent in caustic soda solution than in water. The results seem to show that water either alone or in the presence of caustic soda has practically no action on arsenic. In the presence of

air, however, direct oxidation takes place. If water were concerned in the oxidation, the formation of hydrogen arsenide might be anticipated: $2\text{As} + 3\text{H}_2\text{O} = \text{As}_2\text{O}_3 + 6\text{H}$, $2\text{As} + 6\text{H} = 2\text{AsH}_3$; but this gas was never found in the foregoing experiments.—*Pharm. Journ.*, Dec. 5, 1903, 841; from *Proc. Chem. Soc.*, 19, 243.

Colloidal Arsenic Sulphide—Precipitation of Solutions.—In a preceding communication, F. W. Kuster and G. Dahouer have shown that hydrogen sulphide reacts quantitatively on aqueous solutions of arsenous acid, transforming them into sulphide, the sulphide formed remaining for a longer or shorter time in solution in the colloidal state (*Zeit. Anorg. Chem.*, xxxiii., 105). This colloidal solution is precipitated very rapidly by coarsely-ground Iceland spar. The other substances tried, such as heavy spar, precipitated sulphate of baryta, wood-charcoal, oxide of copper and powdered glass, are much less active. The precipitation is further considerably facilitated by agitation and by the use of a large excess of the precipitating agent. The use of heavy spar (or of the other substances tried) does not seem, as mentioned by Vanino, to show a distinction between true solutions and colloidal solutions; for, as it would be preferable to operate in the presence of a considerable quantity of the

precipitating agent (100 parts of this latter to 1 part of the colloid to be precipitated, for example), it is to be feared that the materials really in solution are only more or less precipitated by reason of surface absorption.—Chem. News, April 29, 1904, 215; from Zeit. Anorg. Chem., xxxiv., 410.

Cadmium Arsenide—Production and Properties.—Albert Granger finds that when cadmium is heated in arsenic vapor in presence of hydrogen or another inert gas, the two elements easily combine. The cadmium arsenide thus obtained is in the form of reddish crystals, its density at 15°C . is 6.211, and its composition is Cd_3As_2 , corresponding in this respect to cadmium phosphide, Cd_3P_2 . This arsenide is a much more stable substance than copper arsenide. Its reaction with acids and the halogens is that of arsenides in general. It is soluble in nitric acid even when this is diluted with water, and it is attacked by chlorine, bromine, all chloro-mixtures, such as aqua regia, and also by oxidizing mixtures.—Chem. News, March 31, 1904, 167; from Compt. rend., 88 (1904), No. 9.

Arsenides of Copper—Products of Direct Combination.—Chemists who have studied the compounds of copper and arsenic have described a number of these bodies, which vary in composition and character according to the method of their preparation, these consisting in direct combination of the elements by heat, in the reaction of arsenuretted hydrogen or hot chloride or sulphate of copper in solution, and in the reduction of arseniate of copper by potassium cyanide. A white compound, Cu_4As_6 , is claimed to be obtainable by the first method, while the black compound, Cu_3As_2 , was obtained by the other two. By reacting with copper on arsenious hydrochloride, Reinsch isolated another arsenide, $\text{As}_3\text{Cu}_3\text{As}_2$, while Descamps obtained Gehlen's arsenide, C_4As_2 , by the reduction of sulphate of copper in solution of arsenic. Albert Granger has now endeavored to obtain arsenides of copper by direct combination, employing an apparatus by means of which he avoids superheating and consequent partial decomposition of the product formed. In a glass tube traversing a sulphur bottle, and through which a current of carbonic acid passes, a porcelain boat filled with copper reduced by hydrogen is placed, and in front of it another boat containing sublimed arsenic. Under these conditions the copper is attacked very easily, and by prolonging the reaction a well-crystallized arsenide, Cu_3As_2 , is obtained, this having the same composition as the body described by Reinsch, the latter, however, being in the form of an amorphous brown powder, while the arsenide obtained by the author occurs in very distinct crystals (in the form of octahedra combined with rhomboidal dodecahedra, having cubic facets on their summits), and is of a steel-grey color. The density of these crystals is 7.56. They gradually become tarnished when exposed to the air; nitric acid dissolves them, and the oxidizing agents, chlorine and bromine, attack them with ease. The arsenide, Cu_3As_2 , corresponds to a phosphide of arsenic, Cu_3P_2 , and like

that body it is decomposed when heated to 1200° . Therefore, while at a higher temperature than that obtained by boiling sulphur in the sulphur bottle it is still possible to prepare a definite and well-crystallized arsenide of copper, the operation becomes more delicate on account of the possibility of superheating. If for any reason the mass is not always kept in the presence of arsenical fumes, there is a loss of arsenic. At the bottom of the porcelain boat, beneath the crystals of Cu_3As_2 , a brilliant brittle ingot is found, which differs very little from the composition Cu_3As if the temperature has not reached 900° ; below this temperature it is still possible to obtain the body Cu_3As_2 if the action of the arsenic is prolonged; but if the conditions of preparation described by the author are carefully observed, only a single arsenide, Cu_3As_2 , appears to be formed.—Chem. News, Dec. 28, 1903, 297; from Bull. Soc. Chim. (3), xxix., No. 14.

Potassium Ferric Arsenite — A Definite and Soluble Compound.—Leonard Dobbin has obtained a definite and soluble compound of potassium, iron and arsenic, in the form of dark reddish-brown scales, as follows: Ferric arsenite was prepared by the interaction of potassium arsenite and ferric chloride, well-washing the yellowish-brown precipitate, and shaking this with successive portions of potassium hydroxide solution, which dissolved the precipitate freely. Dried on glass plates at a gentle heat, a fine scale preparation was produced, which remains quite dry on exposure to air, and dissolves completely in water, forming a strongly alkaline solution. Its probable composition is $6\text{K}_2\text{O} \cdot 5\text{Fe}_2\text{O}_3 \cdot 9\text{As}_2\text{O}_3 \cdot 24\text{H}_2\text{O}$.—Pharm. Journ., April 30, 1904, 585.

Ferri Arsenas, B. P.—Method of Estimating Arsenic Content.—In search of a method for the convenient estimation of the arsenic content in ferrous arsenate, one that shall be as easy a task as that of assaying the iron, Wm. W. S. Nicholls undertook the examination of typical commercial samples of the salt, and as a result describes a satisfactory method which may be briefly outlined as follows: A weighed quantity (0.13 Gm.) of the sample is introduced into a flask (43) provided with a thistle funnel and exit tube, together with powdered ferri sulphas, B. P. (1 Gm.), solution of ferric chloride (10 Cc.), and concentrated hydrochloric acid (20 Cc.). The arsenic trichloride is then distilled over at a low temperature and with continued agitation until the liquid begins to boil, so as to avoid overheating, the distillation being discontinued when about two-thirds of the liquid has distilled. A second distillation is then made after the addition of more concentrated hydrochloric acid (20 Cc.), and, as a precautionary method, a third distillation is made with a further quantity (15 Cc.) of HCl, and a final one with water (20 Cc.). These supplementary distillations can be carried on more rapidly, but the initial one must be carried out at a low temperature under the precautions mentioned, so as to prevent spurting over and contamination of distillate. The arsenic trichloride in the distillate is then estimated, after neutralization with

caustic soda and addition of sodium bicarbonate in excess, by titration with standard iodine solution.—Trans. Brit. Phar. Conf., 1903, 572-577.

Sodium Arsenate—Amount of Lead Acetate Required for Precipitation.

—In consequence of some doubt cast upon the correctness of his observations on the test of the B. P. for determining the purity of sodium arsenate, depending on the amount of lead acetate required for complete precipitation, Thomas S. Barrie has repeated his experiments and finds them substantially correct. He now reasserts that the theoretical amount of official (B. P.) lead acetate required to wholly precipitate 1 Gm. of anhydrous sodium arsenate is 3.05 Gm. (The B. P., 1898, gives 2.03 Gm.—Rep.).—Pharm. Journ., Jan. 23, 1904, 85.

Sodium Arsenate—Reaction with Lead Acetate.—In order to determine the proportions in which sodium arsenate and lead acetate interact, which is subject of considerable divergence of opinion, Leonard Dobbin has made a series of experiments which appear to warrant the following conclusions: (1) That when ordinary sodium arsenate and lead acetate interact in aqueous solution normal lead arsenate is at first the chief product despite the fact that the mixture becomes slightly acid owing to the liberation of acetic acid. (2) That in the presence of added acetic acid, even in comparatively small quantity, the formation of normal lead arsenate is so seriously interfered with that acid lead arsenate largely predominates in the precipitate. (3) That the official quantitative test of purity of sodium arsenate is substantially, although not strictly, accurate.—Pharm. Journ., April 30, 1904, 582.

ANTIMONY.

Metallic Antimony—Action of Organic Acids.—B. Moritz and C. Schneider have made a series of investigations based upon the observation that finely-divided metallic antimony is soluble, in the presence of air, in aqueous solutions of certain organic acids, and of their acid salts. The authors, first of all, establish by measurements made with solutions of citric and lactic acids partially saturated with sodium carbonate, the essential rôle played by the oxygen of the air. They find that solution does not take place in an inert atmosphere; that the amount of oxygen absorbed for each atom of antimony dissolved corresponds to the formation of the oxide, Sb_2O_3 ; that the amount of antimony dissolved, in the presence of an excess of air, increases first with the amount of alkaline carbonate introduced into the solution, reaches a maximum, and then decreases with the addition of more sodium carbonate; and that the amount corresponding to the maximum action is lower than that which would be necessary for the formation of a neutral salt of sodium and antimonyl. The authors then looked for the organic acids capable of dissolving antimony under these conditions. The simple acids of the fatty series,

saturated or non-saturated, are without action. On the other hand, the monobasic acid alcohols (glycolic, lactic, α -oxybutyric, β -oxybutyric, oxyisobutyric), give rise to the phenomena in a most distinct manner. It is the same with oxalic acid, but not with malonic, succinic, malic, tartaric and citric. It is thus shown that the property of dissolving antimony in the presence of air is almost entirely limited to the acid alcohols.—Chem. News, Oct. 2, 1903, 172; from Zeit. Physik. Ch., xli., 129.

MERCURY.

Mercury—Estimation in Organic Combinations.—Frank O. Taylor recommends the following simple method for the estimation of mercury in organic combination. It requires less skill than the method in general use, and can be carried out with the apparatus most frequently found in use: Weigh out accurately enough of the substance to contain from 0.1 Gm. to 0.2 Gm. of mercury. Place this in a glass flask of about 100 Cc. capacity, add 20 Cc. of water and about 1.0 Gm. of potassium chlorate, connect the flask with a reflux condenser, and add through the condenser 5 Cc. of concentrated hydrochloric acid. Now heat the flask and contents on a water-bath, until the decomposition of all organic matter is complete and a clear liquid results, with such additions from time to time of chlorate and acid as are necessary to accomplish this. The time of digestion will be from 4 to 8 hours. Now let cool to 60° C., and then disconnect the apparatus, washing the reflux condenser with water and collecting the washings in the flask. Set aside in a warm place for some hours, or preferably over night, to drive off the dissolved chlorine. After this the mercury, which now exists in solution as mercuric chloride, is precipitated by passing H_2S through the solution, which should be diluted to about 100 Cc. The addition of ammonia to the solution at the moment the H_2S begins passing, avoids the precipitation of sulphur, but can only be used if metals precipitable in alkaline solution are absent. If all the chlorine is not evaporated, sulphur will still be precipitated, and in any case it is safer to digest the precipitated mercuric sulphide with sodium sulphite solution to remove sulphur. Other details of the operation are those customary in the estimation of mercury as sulphide. The weight of HgS found, multiplied by 0.8640, equals Hg. This method is quite accurate, and approximate results may be obtained without the use of a reflux condenser, but for accurate work the condenser is necessary in order to avoid the loss of mercuric chloride volatilized with the water of the solution. Otherwise it need not be employed.—Bull. Pharm., Mar., 1904, 112.

Mercuric Salts—Titration by Means of Potassium Dichromate.—F. M. Litterscheid recommends a method for the volumetric determination of mercuric salts, which is based upon the observation that when a solution of mercuric chloride is treated with an excess of solution of potassium dichromate in the cold, and then with ammonia to distinctly neutral reac-

tion, the mercury is completely precipitated, forming a lemon-yellow precipitate, separating rapidly after vigorous shaking, and soon assuming a granular structure. After 20 minutes' standing, the filtrate gives no reaction for mercury, with either H_2S or $SnCl_2$. The resulting compound,

Dimercuri-ammonium Chromate, is practically insoluble in water. Using potassium dichromate solution in the same concentration (4.9 Gm. : 1,000 Cc.) as that used for standardizing $\frac{N}{10}$ sodium thiosulphate solution, the method is carried out as follows: Mercuric chloride solution (1 : 40) is mixed in a 100 Cc. flask, with an excess of solution of potassium dichromate (4.9 : 1,000). Ammonia solution (10 per cent.) is then added, drop by drop, with rotation of the flask, until the liquid is distinctly alkaline. The mixture is shaken frequently during ten minutes, then filled to the 100 Cc. mark, again shaken, and allowed to stand at least 6 hours. An aliquot part is then filtered off—about one-half—the first portions of filtrate being rejected, and the excess of dichromate, after acidulation with sulphuric acid (1 : 5), titrated in a stoppered flask with potassium iodide and $\frac{N}{10}$ sodium thiosulphate solution in the usual manner. The absence of iodic acid in the KI must be determined. Each Cc. of the dichromate solution consumed indicates 0.276 Gm. Hg.—Arch. d. Pharm., 241, No. 4 (July 11, 1903), 306–313.

Calomel—Soluble Colloidal Form.—Galensky has prepared a soluble colloidal form of calomel and used it therapeutically, but fails to give the method of its preparation. It is a white-grey powder, odorless, tasteless, and soluble in alcohol, ether, benzol and water, forming milk-like solutions. It contains 80 per cent. of mercurous chloride and 20 per cent. albuminoids, reacts neutral, and is perfectly non-irritant when applied in form of dusting powder in luetic ulcerations. It is also used in the form of a moist 2-per cent. bandage and in the form of a 30-per cent. salve, which is used in doses of 4.0, 5.0, 6.0 Gm. for inunctions.—Pharm. Praxis, 1904, No. 1.

Mercuric Oxychlorides—Varieties.—A modern demand for mercuric oxychlorides in prescriptions leaves it somewhat doubtful what is meant, since there are several oxychlorides known to exist. Prof. Francis Hemm, calling attention to this, says that three distinct compounds are mentioned in Brande and Taylor, all three prepared by mixing solutions of mercuric chloride and potassium bicarbonate, but in different proportions. Compounds containing 2, 3 and 4 HgO to 1 of $HgCl_2$ are thus obtainable, all of which have to be prepared, washed and dried in the dark without heat. The particular oxychloride that seems to be required for preparing eye salves by oculists appears to be $3(HgO)HgCl_2$, a yellowish compound obtained by mixing solutions of 10 p. potassium bicarbonate and 4.4 p. mercuric chloride, each in 33 parts of water, washing and drying the precipitate in the dark.—Proc. Mo. Pharm. Assoc., 1903, 107–109.

Mercuric Iodide—Solubility in Fixed Oils.—L. Soulard has made some careful investigations with the object of determining the degree of concentration in which oily solutions of mercuric iodide can be prepared for hypodermic use, using for this purpose a perfectly dry and pure salt, and after triturating this with the oil to finest division, heating the mixture for an hour on a water-bath while stirring. The excess of mercuric iodide was removed by filtration after cooling, and that dissolved determined by assay. He then ascertained that the solubility in different oils was quite variable. Castor oil, dissolved 1.9 per cent.; almond oil, 0.39 per cent.; olive oil, 0.45 per cent.; hemp-seed oil, 0.58 per cent.; nut oil (walnut? Rep.), 1.29 per cent.; linseed oil, 1.23 per cent.; arachis oil, 0.52 per cent.; egg oil, 0.81 per cent.; beech-nut oil, 0.38 per cent.; cod-liver oil, 0.545 per cent.; neatsfoot oil, 0.55 per cent.; vaseline, 0.26 per cent., and rosin oil, 0.41 per cent. Only three of these oils, it will be noted, dissolved more than one per cent. of the biniodide, namely, castor oil, nut oil, and linseed oil. If, however, potassium iodide was added, the solubility of the mercuric iodide was increased in comparatively enormous proportions, as will become apparent on inspecting the following table:

Using	Solubility in 100 Cc. of		
	Olive Oil.	Nut Oil.	Ricinus Oil.
HgI ₂ , KI.....	3.70 Gm. HgI ₂	5.10 Gm. HgI ₂	14.3 Gm. HgI ₂
HgI ₂ , 2KI.....	4.20 Gm. HgI ₂	6.65 Gm. HgI ₂	—
HgI ₂ , NaI.....	4.04 Gm. HgI ₂	5.40 Gm. HgI ₂	16.2 Gm. HgI ₂
HgI ₂ , 2NaI.....	4.80 Gm. HgI ₂	6.60 Gm. HgI ₂	—
HgI ₂ , NH ₄ I.....	1.70 Gm. HgI ₂	1.80 Gm. HgI ₂	—
HgI ₂ , 2NH ₄ I.....	1.80 Gm. HgI ₂	2.10 Gm. HgI ₂	—

—Pharm. Ztg., 49, No. 10 (Feb. 3, 1904), 103; from Journ. Pharm. Chim., 1904, No. 2.

Mercurous Sulphide—Formation after Prolonged Contact of the Metal with Sulphuric Acid.—Some years ago, C. Baskerville and F. W. Miller, when investigating the action of sulphuric acid on mercury, concluded that there was no analogy between the reaction which takes place with that metal, compared with the action of copper and sulphuric acid, no sulphide being produced and no free sulphur. Subsequent experiments have, however, induced Baskerville to modify this view. He has now found that by prolonged contact, extending over five years, at ordinary temperatures, a layer of brownish-black mercurous sulphide is formed on the surface of the

metal, and sulphurous acid is evolved. The analysis of the compound agreed with the formula Hg_2S . It would appear, therefore, that under certain conditions the reaction between mercury and sulphuric acid resembles that of copper more closely than is generally known.—*Journ. Amer. Chem. Soc.*, 25, 799.

Mercuric Oxides—Differences between the Red and Yellow.—Schoch finds that yellow mercuric oxide is, when washed and dried at ordinary temperature, a crystalline body, whose structure differs materially from that of the red oxide. The yellow oxide occurs in the form of quadratic plates under the microscope with a magnification of 1000 or 1200 diameters. The crystals of yellow oxide grow larger when brought into contact with the precipitant solution or with a solution of sodium or potassium chloride. At the same time the crystals grow reddish-orange, until after some time they become decidedly reddish. When boiled with salt solution the yellow oxide becomes red and shows the prismatic crystals of the red oxide. Heating the yellow oxide dry to 250 degrees C., or higher, gives rise to a change in color to red and to a change in structure to the prismatic form of the red oxide.—*Amer. Drugg.*, 44, No. 2 (Jan. 25, 1903), 46; from *Chem. Ztg.*, 1903, 27, 155.

SILVER.

Colloidal Silver—Nature of Commercial Product.—In a previous research Hanriot has shown that the commercial product known as "collargol" is not an allotropic modification of silver, but an alkaline salt of a true acid, namely,

Collargolic Acid. On seeking to purify this product by means of dilute acetic acid and ammonia,

Lysalbinic Acid remains in the mother liquor, and after four precipitations, the proportions of the two substances become constant; silver, 93.1 per cent., and lysalbine, 6.1 per cent. The investigation of the properties of this body was one of the objects of the present research.—*Chem. News*, July 17, 1903, 35; from *Compt. rend.*, 86 (1903), No. 24.

Colloidal Silver—Properties.—Referring to the above-mentioned research of Hanriot on the nature of the commercial product, Collargol, A. Chassevant and S. Posternak communicate the results of their investigation into the nature of colloidal silver carefully prepared by themselves by a method analogous to that of Carey Lea. This product was of a greyish metallic appearance, with some iridescence, contained 90.08 per cent. of silver, and a little iron and citric acid, but does not contain any albuminoid matter. It was almost insoluble in water, but dissolves to a great extent in ammonia, giving a deep brown coloration. Subjected to the action of numerous chemical and physical reagents, which are described in detail, the authors find, contradictory to the results obtained by Hanriot

with the commercial product, that colloidal silver, as obtained by them, possesses the properties of a colloid, and that a definite chemical function cannot be attributed to it. If it were admitted that colloidal silver is an acid, because of its solubility in ammonia and in the alkalies, it would be necessary also to admit that it is a base because of its solubility in acetic acid. Commercial collargol contains, among other impurities, an albumoid substance. This may mask or modify the reactions of the metallic colloid.—Chem. News, July 21, 1904, 39; from Bull. Soc. Chim. (3), xxix, No. 11.

Colloidal Silver—Albuminoids an Integral Component.—In a subsequent research, Hanriot finds that the so-called colloidal silvers have definite chemical composition and properties. He proves that the albuminoid matter in collargol does not constitute an impurity, but forms an integral portion of the molecule, not only because it is apparently impossible to separate the constituents without destroying the colloidal silvers, but also because these bodies have lost their reactions and habitual solubilities. All colloidal silvers when heated in a vacuum evolve carbon dioxide and hydrogen, and have a greater reducing power than that of the silver they contain.—Chem. News, Aug. 14, 1903, 83; from Compt. rend., 87 (1903), No. 2.

Colloidal Silver—Preparation and Properties.—In some new experiments, A. Chassevant prepared colloidal silver according to Schneider's method, by mixing 500 Cc. of a 10 per cent. solution of nitrate of silver, 500 Cc. of a 30 per cent. solution of ferrous sulphate, and 700 Cc. of a solution containing 280 Gm. of crystallized citrate of sodium. The reddish deposit obtained was separated from its ferruginous mother-liquor, by means of a filter-pump, and purified by resolution in distilled water, precipitation from this solution by twice its volume of 95 per cent. alcohol. The addition of the alcohol causes a bluish-black deposit to be formed. The mixture is filtered through a Chamberland cylinder. The alcoholic solution of ferric citrate traverses the filter, and is collected in a recipient, whilst the precipitate of colloidal silver is deposited on the outside of the filter in the form of a pasty crust. After some time the filter no longer acts; it is then withdrawn from the liquid, but the aspiration is continued until the crust assumes an iridescent, brilliant metallic appearance, and seems to be dry. Then placing the filter in a glass containing distilled water, the colloidal silver is allowed to dissolve. After two purifications carried out in this way, 100 Cc. of the solution contained 0.300 Gm. of material dried at 100° C., 0.2897 Gm. of this, or 96.59 per cent., being silver. This pure solution of colloidal silver has all the properties of colloids, which have been published by the author and his friend Posternak, and which have been partly observed by others. The author finds that the colloidal form of silver is stable in pure solution in water, alcohol, or glycerin. In the presence of other colloids it can be conserved

in the colloidal form, even in the solid state, with lylalbinic acid. If a solution of pure colloidal silver is treated with another colloid, such as gum, gelatin, or a sodic solution of acid albumose, and the solution is evaporated in the cold *in vacuo*, a solid mass is obtained in which the silver has preserved its physical colloidal state, and can be redissolved in distilled water. On the other hand, simple evaporation, the influence of electrolytes, precipitation by metallic salts, etc., transforms it into metallic silver. Colloidal silver, collected and dried on a Chamberland filter, will keep on porcelain in concentrated alcohol. It is soluble in alcohol in the presence of water, and easily soluble in glycerin at 30° C., but is insoluble in absolute alcohol.—Chem. News, May 6, 1904, 218.

GOLD.

Gold—Precipitation in Crystalline Form by Means of Formic Aldehyde.—According to N. Averkief, a solution of chloride of gold, strongly acidulated with hydrochloric or nitric acid, yields well developed crystals of the metal on the addition of formic aldehyde. At the ordinary temperature the reaction is slow, and requires several days; if heated on the water-bath, a few hours is sufficient. The crystals are visible to the naked eye; their form is very definite; as a rule, they are combinations of the cube and the octahedron. Rhombohedral dodecahedra, trapezohedra, and solids with forty-eight faces are also found. Their elements can be distinguished very easily with a magnification of 100 or 200 diameters. The length of the crystals deposited in the cold is about 0.9 Mm.; that of the crystals deposited under the influence of heat is less. For 200 or 300 Cc. of solution of chloride of gold containing 0.01 Gm. of gold per liter, 10 Cc. of the ordinary solution of formic aldehyde are used. Gold can also be precipitated in the crystalline form, in the presence of ferrous or ferric salts, of salts of copper, antimony, mercury, zinc, lead, manganese, tin, arsenic, and of the metals of the first and second groups; the solutions must be strongly acid, as in a neutral or slightly acid solution containing iron, the latter is precipitated in the form of a fine powder, having a crystalline structure. The density of the crystalline gold, precipitated by formic aldehyde, was found to be 19.4278 and 19.4341; mean, 19.43095.

Platinum also is precipitated in the crystalline form under the same conditions, but more slowly than gold, especially in dilute solutions.—Chem. News, August 14, 1903, 84; from Germ. Soc. Phys. Chim. R., xxxiv., 828.

Colloidal Gold—Preparation and Character of its Aqueous Solution.—For the preparation of an aqueous solution of colloidal gold, A. Gutbier dissolves 1 Gm. of AuCl₃ in 1 liter of distilled water and adds carbonate of soda until neutral. The solution is then treated in the cold, and slowly, with a few drops of a very dilute solution of hydrate of hydrazine (the commercial solution at 50 per cent. diluted with 2,000 volumes of water).

An excess of the hydrazine solution must be avoided. The colloidal solution is deep blue in color, both by reflected and by transmitted light. Its color is similar to that of indigo. If by reflected light the liquor has a golden appearance, it is because too much hydrazine has been added, and in such a case the precipitation of the gold takes place at once. The solutions are easily dialyzed, and are very stable. Electrolysis causes the precipitation of the metal.—Chem. News, Mar. 18, 1904, 143; from Zeit. Anorg. Chem., xxxi., 448.

Colloidal Gold—Production by the Action of Reducing Phenols.—Henrich has described, under the name of colloidal gold, solutions obtained by treating gold chloride with certain reducing phenols, such as pyrocatechin and hydroquinone. Hanriot has prepared one of these substances with pyrocatechin, obtaining a blue powder, slightly soluble in pure water, readily soluble in alkalies, especially in ammonia, but insoluble in water containing a slight excess of sulphuric or nitric acid. He discovered also the curious fact that colloidal gold does not dissolve in mercury. The composition of this colloidal gold, dried at 40° C., was as follows: Water lost at 100° C., 2.04; water lost at a red heat, 6.31; gold (direct estimation), 91.53; SO₃, 0.39.—Chem. News, May 27, 1904, 262; from Compt. rend., 88 (1904), No. 17.

Gold Fluoride—Non-Existence.—Although gold is frequently found accompanying fluorspar in nature, Victor Lenher finds that in ordinary conditions a direct compound of gold and fluorine, as gold fluoride, does not exist. Gold oxide was found to be absolutely unacted on by hydrochloric acid, even when they were boiled together for weeks, either alone or mixed with nitric acid. Nor was gold fluoride produced by double decomposition when solutions of silver fluoride and gold chloride were mixed. Instead of an interchange of halogens, the reaction took place according to the equation, $\text{AuCl}_3 + 3\text{AgFl} + 3\text{H}_2\text{O} = 3\text{AgCl} + \text{Au}(\text{OH})_3 + 3\text{HF}$. It is evident that, even if formed, gold fluoride would be instantly decomposed by contact with water. Attempts to effect the double decomposition by means of anhydrous solvents have failed, no solvent common to both salts, in which neither was decomposed, having been found.—Journ. Amer. Chem. Soc., 25 (1903), 1136.

PLATINUM.

Platinum—Oxidation.—It has heretofore been held, and it is so stated in all text-books and the literature that platinum is non-oxidizable, and distinguished in this respect from all other noble metals. Lothar Wöhler has now, however, shown by his researches and demonstrated by a series of experiments that this assumption is incorrect, and that platinum in the form of platinum black is oxidizable by air or oxygen at all temperatures, and that platinum enclosing oxygen reacts as an oxide and, in conformity with this condition, is soluble in hydrochloric acid. Thus

he proves the presence of an oxide in spongy platinum by its ability to oxidize potassium iodide; by the actual solution of the oxide in diluted hydrochloric acid, etc.—Pharm. Ztg., 48, No. 95 (Nov. 28, 1903), 962.

ORGANIC CHEMISTRY.

GENERAL SUBJECTS.

Organic Chemicals—Methods of Complete Identification.

Medicinal Organic Chemicals—Methods of Complete Identification.—

C. Kollo has for some time been engaged in researches undertaken with the object of devising methods suitable for the identification of medicinal organic chemicals, based upon absolute recognition and characteristics of the chemical groups composing them. While such a method is probably impracticable in many cases, nevertheless it seems practical in some and will at all events be sure to lead up to more accurate and convincing methods than are those depending on certain color reactions. The following example will illustrate the author's ideas and method:

Atropine, being the tropic acid ester of tropine, the final step is to determine the *tropic acid*, as follows: A fragment of potassium bichromate and about 2 Cc. of concentrated sulphuric acid are introduced into a test-tube, then a few small granules of atropine, followed by about 10 drops of alcohol, and heat is applied. The *odor of benzaldehyde* is at once developed. The *tropine* is next determined as follows: About 0.15–0.20 Gm. of atropine is heated to 110°–120° C. with a few cubic centimeters of fuming hydrochloric acid, allowed to cool, and soda solution is added to alkaline reaction. The tropine thus split off is shaken out of the mixture with ether, the ether solution is evaporated and treated with fuming hydrochloric acid. If this solution is then heated strongly, a strong *conine-like odor* is developed. In further illustration it may be mentioned that by similar simple methods, the different groups composing the following organic compounds are readily identified: In *Bromoform* (= Tribrom methane), the methane group and the bromine; in *Chloralformamide*, the chloral is recognized by the chloroform produced, the ammonium formate is split into ammonia and formic acid, both of which are easily recognized; in *Cocaine* (methyl-benzoyl ecgonine), the recognition of the benzoyl group of ecgonine, and of the methyl group is provided for, etc., etc.—Pharm. Ztg., 49, No. 32 (April 20, 1904), 333–334.

HYDROCARBONS.

Acetylene—Reaction with Alkaline Hydrides Dependent on the Presence

of Water.—Moissan has heretofore shown that acetylene reacts with energy on alkaline hydrates at ordinary temperature and under reduced pressure, liberating hydrogen, and forming acetylenic acetylides, while at ordinary pressure this reaction is violent and sometimes accompanied by a slight incandescence. Further investigation has shown, however, that this only takes place at ordinary temperatures in the presence of a trace of water. If the acetylene gas be absolutely dry it exerts no influence whatever on the hydride until the temperature is raised to 42° C. Nor does any reaction take place when the same dry ingredients are cooled to -80° C. by immersing the containing vessel in liquid oxygen. If, however, a minute vessel containing a few milligrammes of water be included in the apparatus and broken when the temperature is reduced to -60° C., reaction takes place one or two minutes later as the temperature is allowed to rise slowly, indicating that the presence of only so much water in the atmosphere of the apparatus as is represented by the vapor tension of the ice is necessary to start reaction. It is supposed that this trace is sufficient to raise the temperature, at some point, to 42° C., and thus to start reaction, which at once becomes general.—Pharm. Journ., Nov. 7, 1903, 661; from Compt. rend., 137, 463.

Acetylene—Non-Toxicity.—Panisset states that the long-established presumption that acetylene is a poisonous gas, and that it forms an oxycarbonated hæmoglobin with the blood of mammals, is erroneous. Although this statement was first made in 1868 by Liebreich and Bristow, and was afterwards supported by others, he has kept animals for various periods in an atmosphere containing as much as 50 per cent. of acetylene without being able to detect any alteration in the hæmoglobin of the blood; but the blood plasma dissolves some of the gas.—Pharm. Journ., Jan. 30, 1904, 117; from Bull. de Therap., through Répertoire [3], 15, 537.

Dibromo-Acetylene—Formation and Characters.—P. Lemoult has succeeded in preparing dibromo-acetylene and identifying it by certain characteristic properties. The principle of the preparation consists in transforming two molecules of HBr into symmetric tetrabrom-ethane, $\text{CHBr}_2\text{—CHBr}_2$. This transformation is attended by many difficulties, because the body obtained is spontaneously inflammable in air, is decomposed by heat, and is explosive. It is a colorless liquid of density 2; it is incapable of being distilled without decomposition even *in vacuo*; its boiling-point is about 80° C.; and it is soluble in the majority of organic solvents.—Chem. News, July 3, 1903, 11; from Compt. rend., 86 (1903), No. 22.

Petroleum Hydrocarbons—Fractional Separation by Means of Alcohol.—K. Kharitchkopf has written an interesting brochure on the separation of petroleum hydrocarbons in a cold state by means of alcohol, which is serially reproduced in the "Petroleum Review." It is considered possible that the process described may lead to many new applications of petroleum

hydrocarbons which have hitherto been practically unknown.—Pharm. Journ., Oct. 17, 1903, 548.

Crude Petroleum—Value as an Internal Remedy.—From experiments conducted on his own person, A. D. Binkerd speaks in the highest terms of the value of crude petroleum as an antiseptic stimulant of the digestive organs. Commencing with daily small doses, he found that the appetite and weight rapidly increased, and digestion was improved under the petroleum treatment, while no nausea or other ill effects were observed. The good results thus personally obtained induced him to prescribe petroleum for patients. It has been found most efficient in checking diarrhoea, in cases of mal-assimilation and constipation; also as a substitute for cod-liver oil, and in the treatment of typhoid fever. The average dose is a teaspoonful. The author, speaking after having taken the remedy for two years without intermission, claims that it is absolutely harmless. The petroleum employed was the light variety of the crude oil, not the dark, heavy kind with an offensive odor.—Pharm. Journ., May 28, 1904, 751; from Therap. Gaz. (3), 19, 799.

Benzonaphthol—Detection of Free β -Naphthol.—A. Jorissen observes that benzonaphthol is apt to contain free β -naphthol as impurity, and recommends for the detection of the latter to add 20 Cgm. of the sample to 2 Cc. of glacial acetic acid, followed by two drops of citric acid solution. Pure benzonaphthol remains colorless, but if β -naphthol is present the mixture acquires a yellow tint.—Pharm., Sept. 26, 1903, 453; from Journ. de Pharm. de Liege, through Repertoire (3), 15, 365.

Crude Ichthyol Oil—Source and Method of Production.—F. Lüdy gives an interesting description of the method employed for the extraction of the crude oil from which ichthyol is prepared by its manufacturers, from the greyish bituminous schist, known locally as "oelstein" or "stinkstein." This is found in many localities in the Karwendel range of mountains which separates Bavaria from Tyrol, but the bulk of the crude oil is produced in the immediate neighborhood of the village of Seefeld, a station about midway between Zirl and Mittenwald, on the Vorarlberg Railway. The skirt occurs in veins varying from one or two decimeters to a meter in thickness, and is characterized by having impressions of various marine animals, particularly of fishes, distributed throughout the mass. From very ancient times this crude oil, known as "stone-," "dürsten-," "blood-," and "dürschen-oil," has been produced by the peasantry, and it is to be found in most peasant homes to the present day, being employed as a home remedy for wounds of all kinds, as well as in rheumatism and other ailments requiring relief from pain. Up to very recent times the oil has been prepared by the peasantry and by small firms throughout the Tyrol, and thousands of kilograms have thus annually been sold and sent in all directions; but at present it is produced on an industrial scale for the preparation of the various ichthyol compounds of commerce. The author

gives a description of the process employed, accompanied by an illustration showing the arrangement of the furnace, crucibles, etc., used in its manufacture, from which the following may find place here :

The schist is obtained by driving headings into the mountain to a distance of 200 to 300 meters. It contains from 1 to 10 per cent. of oil, which makes its presence perceptible by its strong, penetrating odor ; if very rich in oil, drops will soon exude from the rock when exposed to the heat of the sun. The schist is picked over, the poorer thrown aside, and the better broken into lumps about the size of the fist. With these, large cast-iron crucibles, holding about 30 kilos, are filled ; the crucibles are then covered with a lid pierced with holes and inverted. Nine or twelve such crucibles are arranged in a rectangular space and surrounded by a wall of stones about half a meter high. Between the crucibles, split fir logs are laid, which are kindled. The heat makes the oil sweat out of the rock ; it trickles through the lid of the inverted crucible into a small drain, which communicates with several crucibles, and which carries the oil beyond the stone wall into a wooden tub, of which about three are contained in a large wooden box. From the latter a pipe leads to a barrel and allows of the escape of the gases produced, whilst any oil vapor condenses in the box and drains into the barrel. The whole arrangement is a primitive form of downward distillation. The operation lasts about six hours, and is performed twice in a day, nine crucibles giving about 15 to 25 kilos of oil per day. On standing, water and pitch separate from the oil which floats on the surface ; it is skimmed off, transferred to petroleum barrels and sent to market. The crude oil thus produced contains about 2.5 per cent. of sulphur. By treating it with concentrated sulphuric acid sulphichthyolic acid is produced, and this, neutralized with ammonia, forms the sulphichthyolate of ammonium (ichthyol) of commerce, which contains, in addition to sulphichthyolate of ammonium, about 50 per cent. of water, 5 to 7 per cent. of ammonium sulphate and 1 per cent. of a volatile oil with strong, penetrating odor. Inasmuch as it has been shown that the unpleasant odor of ichthyol can be removed without injury to the therapeutic value of its preparations, it is somewhat remarkable that odorless ichthyol preparations are not supplied by their manufacturers.—*Pharm. Centralh.*, 44, No. 41 (Oct. 8, 1903), 691-696.

VOLATILE OILS.

Odorous Principles of Plants—Circulation.—From observations conducted on the orange tree, E. Charabot and G. Laloue conclude that the odorous principles formed in the leaves are transferred to the stem. The essential oil in the stem contains less soluble constituents than that of the leaves ; the difference is slight at first, but increases with the growth of the plant. The soluble bodies carried from the leaf to the stem throw out of solution the less soluble substances which form the stem oil.—*Pharm. Journ.*, June 25, 1904, 852 ; from *Comp. rend.*, 138, 1,229.

Volatile Oil—Formation in the Chlorophyll-containing Organs of Plants.—From experiments performed on peppermint plants, E. Charabot and A. Hébert find that the systematic and complete removal of inflorescences from growing plants brings about a marked increase in the stems and green parts, with a corresponding increase in the percentage-yield and absolute weight of oil obtained on distillation. Essential oil is formed in the greatest quantity in the green parts, which furnish it to the inflorescences. Light has a marked influence on the secretion of essential oil, more being formed in those parts freely exposed to its influence than in those which are shaded.—Pharm. Journ., April 2, 1904, 466; from *Compend.*, 138, 380.

Essential Oils—Natural and Synthetic Production.—In a paper read before the British Association (Section B), at the Southport meeting, 1903, Dr. O. Silberrad discusses interestingly the method pursued for the extraction of essential oils from their natural sources, and, particularly, of their synthetical production. The production of essential oils, although of extreme antiquity, has only recently been made the subject of scientific research. The earliest methods of extraction from the plants were exceedingly crude, and it was only in the early part of the nineteenth century that the industry received a new impulse by the introduction of steam distillation. Chemical research has in recent years led to the replacement of the natural oils to some extent by products artificially prepared. As an instance of this, the author's recent discovery that carvone, $C_{10}H_{14}O$, the odorous principle of caraway oil, could be obtained direct from limonene by autoxidation. Other instances are the artificial production of the active constituents of ylang-ylang, neroli, carnation, and oil of myrrh, specimens shown by the author illustrating how nearly the synthetic products approach to the natural perfumes. The manufacture of terpineol from turpentine by the use of less costly reagents, of heliotropine (piperonal), and of vanillin from safrol, an abundant constituent of camphor oil, the separation and study of eugenol from oil of cloves, of linalool from bergamot and other oils, of geraniol, important as the chief ingredient of otto of roses, and the isolation of the delicate odorous principles, such as jasmone from jasmine flowers, irone from orris root, are referred to by the author, who also gives brief consideration to the oxygenated products and esters produced by modern research from a variety of natural oils.—Chem. News, Oct. 30, 1903, 216.

Essential Oils—Value of Index of Refraction.—Ernest J. Parry discusses the value of the refraction index of essential oils. While this has long been put on one side as not affording information commensurate with the trouble involved in its determination, this being doubtless true, for example, with the oils of the citrus family, the author finds that in the case of certain other oils, such as oil of rose, citronella oil, peppermint oil, geranium oil, etc., the determination of the index of refraction is of decided

value when used with discretion. In the case of otto of rose, for instance, the distinction from the much higher refractive index of geraniol enables the recognition of geranium oil as adulterant.—Trans. Brit. Pharm. Conf., 1903, 598–600.

Volatile Oils—Solubility in Diluted Alcohol.—Dr. Richard Witte calls attention to the effect which slight differences in the strength of alcohol may have on its solvent action on volatile oils. As little as a difference of 1 per cent. in strength may under circumstances lead to wrong conclusions concerning the identity or character of a volatile oil, and there should, therefore, be no deviation from the adopted standard. It is unfortunate, therefore, that the Pharm. Germ. IV, has adopted diluted alcohol for determining the solubilities of certain volatile oils—this diluted alcohol being defined as having the sp. gr. 0.896–0.892 at 15° C., corresponding to 68–69 volume per cent. of absolute alcohol. The author points out that this is probably due to an oversight of the Pharmacopœia Commission, who, regarding the diluted alcohol as being of a 70 per cent. strength, because generally so designated, accepted it as a convenient equivalent for the 70 per cent. alcohol designated by all authoritative works—with the single exception of the Ph. Germ.—for effecting clear solutions with certain oils in certain proportions. Thus, he has known an oil to form a turbid solution with 69 per cent. alcohol under careful observance of temperature, while a perfectly bright solution of the same oil was produced with an alcohol of 70 per cent., and similar cases have been frequently noted.—Apoth. Ztg., 18, No. 52 (July 1, 1903), 451.

The Sesquiterpenes—Investigation.—In continuation of Oswald Schreiner's monograph on "The Sesquiterpenes" (see Proceedings, 1903, 882), this author gives a detailed description of *caryophyllene*, and enumerates the oils in which it has been found as a constituent, viz., oil of black pepper, oil of copaiba, oil of canella, oil of cloves. The methods of its preparation, its physical and chemical properties, and the characters and properties of its derivatives are also described. Similarly, the author describes the sesquiterpenes derived from some sixty different oils, which must be consulted in the original in Pharm. Archives, Nos. 7 and 8, 1903, and in Pharm. Review, 22, Nos. 2, 3 and 4 (Febr., Mar., and April, 1904), 60, 101 and 131.

Pinene—Action of Bromine in the Presence of Water.—P. Genouesse and P. Faure have re-investigated the action of bromine on pinene, which has heretofore been the object of numerous researches with many contradictory results, by a new method. They operated in presence of water and at a low temperature, the oil obtained being retained by the water vapor. A colorless liquid, lighter than water, is first produced, which consists chiefly of pinene; after this, a yellow oil, heavier than water, is obtained, from which cymene can be extracted; and, finally, a liquid which crystallizes distills over, the residue in the apparatus remaining as a brown,

viscous mass. The crystals so obtained, after recrystallization from acetic ether, melt at 167° to 168° C., and constitute a saturated compound, which analysis shows to be "pinene dibromide," $C_{10}H_{16}Br_2$. The formation of this substance is of great importance because it proves the divalence of pinene.—Chem. News, Aug. 14, 1903, 83; from *Compt. rend.*, 87 (1903), No. 2.

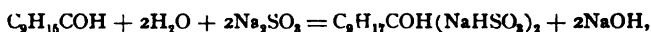
Iodterpin—A New Compound.—Mas and Quindal have obtained a new compound by the action of iodine on terpin hydrate, which in its physical and chemical properties differs essentially from its components. It is obtained by simply mixing together equal parts of iodine and terpin hydrate, triturated as finely as possible, and heating the mixture on the water-bath. The product is liquid, black in thick layers, red in thin, and has a peculiar odor, reminding of terpin hydrate but not of iodine. Its sp. gr. at 15° C. is 1.19, boiling point between 165° and 175° C., is soluble in ether, petroleum ether, chloroform and benzol, and easily miscible with water, forming a brown-red fluid. Absolute alcohol dissolves one-tenth of its weight. Being readily absorbable, it is recommended as a substitute for iodoform, and is best applied in the form of salve, but may also be used in powder form by mixing it in the amount of 20 per cent. with sterilized kaolin.—Apoth. Ztg., 19, No. 2 (Jan. 6, 1904), 14; from *El Monit. de la Farm.*, 1903, 430.

Iod-eugenol—A Substitute for Iod-thymol.—E. Liotard recommends iod-eugenol as superior to iod-thymol as disinfectant for syphilitic wounds, skin tuberculosis, cancer, &c., and gives the following formula for its preparation: Dissolve 60.0 iodine and 80.0 potassium iodide in sufficient distilled water to make 300 Cc., and mix this with a solution of 15.0 eugenol in 52.0 solution of sodium hydrate and enough distilled water to make 300 Cc. The precipitate is washed to free it from alkali, and dried by gentle heat. So obtained, iod-eugenol is a reddish powder having a faint eugenol odor, melting at 78° C. with evolution of iodine vapor, insoluble in water, sparingly soluble in alcohol, but soluble in ether, fixed oils, and in soda solution.—Apoth. Ztg., 19, No. 23 (March 19, 1904), 187.

Aromatic and Fatty Aldehydes—Basic Reaction and Its Availability for their Estimation in Volatile Oils.—While carrying on some work on oils of orange and lemon, Prof. Samuel P. Sadtler found it very difficult to get accurate determinations of the citral in certain of these oils. They were so-called oleo-resins of orange and lemon, which contain a relatively large percentage of acid resins, and being obtained by extraction with a volatile solvent, appear to contain certain constituents which are either not extracted at all, or else in smaller proportions, by the processes of expression. Finding the use of sodium bisulphite unsatisfactory for the determination of the aldehydes in these oils, the author had recourse to sodium sulphite instead, which, on the application of the heat, resulted in the formation of dihydrodisulphonate of sodium and the splitting off of two molecules of

sodium hydrate. It having been pointed out by Tiemann in his work on the aldehydes of lemon-grass oil, that the reaction could be indicated by phenolphthalein and the addition of solution of sulphurous acid from time to time, it occurred to the author that this reaction might be made available under suitable modifications for the estimation of the aldehydes in volatile oils, and experiments made have fully justified the opinion. Preliminarily, he found that the acid resin present in these oils, unless previously neutralized, interferes with the results; but this difficulty was overcome by neutralizing these acids with $\frac{N}{2}$ KOH (this probably being incidentally available for their determination), using rosolic acid as indicator, which also serves as indicator in the subsequent reaction. The examination of oil of lemon, for instance, is thus carried out as follows: 5 or 10 Gm. of the oil are weighed into an Erlenmeyer flask, and, after neutralization, 25 or 30 Cc. of a 20-per cent. sodium sulphite solution, depending upon the amount taken, is added. Before adding the sulphite solution, however, it is neutralized with a little $\frac{N}{2}$ HCl, after being heated by immersion in a water-bath. The sulphite used in these experiments required about .75 Cc. of $\frac{N}{2}$ HCl to neutralize at boiling temperature, with rosolic acid as an indicator. When the solutions were mixed a red color formed at once in the aqueous layer. This was discharged from time to time with $\frac{N}{2}$ HCl. The flask is then heated and agitated frequently. The reaction is complete in about half an hour, if kept hot and the layers mixed frequently. When the color is all discharged, or all but a very faint pink, which is not appreciably affected by a few drops more acid, the number of cubic centimeters of standard acid is noted. An emulsion forms, due to the neutralized resins, but that does not interfere with the reaction, if care is exercised.

The reaction, as written by Tiemann, is :



and is probably correct, as the amount of citral and sulphite is shown below to be in the ratio of 1 to 2. The amount of standard HCl used, expressed in terms of citral in the above ratio, divided by the weight of the oil taken, gives the percentage of citral. Two determinations thus effected in an analysis of lemon oil gave respectively 5.24 and 5.29 per cent of citral, while some known mixtures of citral and separated lemon oil terpenes, containing 8.68 and 12.11 per cent. of citral, gave respectively 8.85 and 12.15 per cent. by the proposed method. Experiments made with vanillin and with other aldehydes indicate its availability as well as its great delicacy. It will indicate the presence of one part of formaldehyde in one million parts of water.—*Amer. Journ. Pharm.*, 76, No. 2 (Feb., 1904), 84-87.

Cinnamic Aldehyde—Gravimetric Determination.—J. Hanus finds that cinnamic aldehyde forms quantitatively a crystalline semi-oxamazone,

$C_{11}H_{11}N_3O_2$, when its aqueous suspension is treated with a watery solution of semi-oxamazide, which may be collected and weighed. He states that the determination of cinnamic aldehyde, either in the commercial synthetic product, in cinnamon or cassia oil, or in the barks, may be more accurately made by this method than by the bisulphite absorption process usually adopted. From 0.5 to 2 Gm. of the oil, or 0.1 Gm. of the synthetic aldehyde, is emulsified by agitation with 100 Cc. of water. From 0.25 to 0.35 Gm. of semi-oxamazide, dissolved in 15 Cc. of hot water, is added to the emulsion, and the mixture, after well agitating occasionally for three hours, is set aside for twenty-four hours. The precipitated cinnamic aldehyde semi-oxamazone is then collected on a tared Gooch filter, washed with cold water, dried for four or five hours at $105^{\circ}C.$, and weighed. The weight thus obtained, multiplied by 0.6083, gives the amount of cinnamic aldehyde present. Cinnamon and cassia barks are steam-distilled, 5 to 8 Gm. being operated on. The distillate, which should measure about 400 Cc., is shaken out with ether. The ethereal solvent is distilled off at 60° to $70^{\circ}C.$, and the residual oil, emulsified with water, is treated with semi-oxamazide solution, as described above. The results, obtained with synthetic commercial cinnamic aldehyde are 5 per cent. lower than those obtained by the bisulphite method. Those obtained by weighing the semi-oxamazone from cinnamon and cassia oil are, however, from 4 to 6 per cent. higher than the figures given by the absorption method.—Pharm. Journ., Oct. 31, 1903, 613; from Zeits. für Untersuch. der Nahr. und Genussm., 6, 817.

Citral—Methods of Assay in Volatile Oils.—E. Kremers and I. W. Brandel contribute a valuable paper on the citral assay of volatile oils, in which they trace the history of this important constituent of lemon oil and critically review the various methods for citral determination recommended up to the present time. Citral was first discussed in the oils of *Eucalyptus staigeriana* and *Backhauria citriodora* in 1888, and a little later in oil of lemon by Bertram, and in other oils with more or less of a lemon-like odor. With this discovery, both the qualitative and quantitative examination of lemon oil entered upon a new period, for up to 1888 limonene was the only known constituent of lemon oil that was well authenticated; but the facts that the odor of oil of lemon is quite distinct from that of pure limonene, and that the better quality oils cannot be made by distillation, demonstrated clearly that the peculiar aroma of oil of lemon was due principally to constituents unknown in 1888. The isolation of citral at that time from oil of lemon was, therefore, an important step in advance. With it the possibility was given of working out a chemical method for the assay of the oil, and it is with the discussion of the various methods that have been suggested that the present paper is concerned. The methods reviewed and criticized by the authors are the following: (1) The sodium acid sulphite method, in common use for the

estimation of other aldehydes. (2) A modification of the sodium acid sulphite method, suggested in 1901 by Burgess & Child. (3) The normal sodium sulphite method, as suggested by Tiemann and modified by Sadtler in 1903. (4) The phenyl-hydrazine method, suggested by Benedict and Strache in 1893. (5) The method depending on the reduction of citral to geraniol and subsequent acetylation, recommended by Garnett in 1896. (6) The method of condensation of citral with cyanacetic acid into a characteristic crystalline compound, suggested by Tiemann in 1898. (7) The method of estimation as citraloxime produced by hydroxylamine, of Schimmel & Co., and of Walther (1899). (8) The method proposed by Doebner (1894), depending on the formation of a characteristic compound by means of pyrrolic acid and β -naphthylamine.

Of these different methods, all of which were tried experimentally, the authors recommend the

Sodium Acid Sulphite Method, which is to be carried out as follows:

FIG. 62.



Cassia Flask.

Transfer 5 Cc. of the oil with a pipette to a "cassia flask," add 25 Cc. of 80 per cent. sodium acid sulphite solution, and place the flask in a water-bath at a temperature of 60° C. for thirty minutes, shaking the flask from time to time. After allowing the flask and contents to cool completely, dilute gradually with distilled water, shaking well after each addition, until the flask is filled up to the mark in the graduated neck of the flask, which shows the amount of oil remaining after the removal of the aldehyde (citral) by the acid sulphite, the calculation being then made in the usual manner. The so-called "cassia flask" recommended by the authors is shown by the accompanying cut (Fig. 62), and requires little explanation. It has a capacity of about 100 Cc., with a neck 13 Cm. long, having an inner diameter of 8 Mm., and is calibrated to $\frac{1}{10}$ Cc.; the total capacity of the neck being about 6 Cc., and the zero-point fixed slightly above the point where the flask is narrowed into the neck. The authors have also obtained reliable results with the volumetric method for the assay of citral proposed by Sadtler, which is based on the observation of Tiemann, that if citral is agitated with

a neutral solution of sodium sulphite, a sodium salt of the sulphuric acid is formed and sodium hydroxide is liberated—the latter being titrated and the corresponding citral content ascertained by calculation, using the citral-factor 0.03802 for each Cc. of $\frac{N}{2}$ HCl consumed.—Pharm. Rev., 22, Nos. 1 and 2 (Jan. and Feb., 1904), 15 and 72.

Citroptene—Chemical Constitution.—Professor Ernest Schmidt, after

reviewing briefly the observations of the earlier investigators concerning the nature of the stearoptene of lemon oil, which has been variously designated also as lemon camphor, limellin and non-citroptene, gives the results of an investigation of this substance obtained by him from residues resulting from the manufacture of lemon oil by Heine & Co., of Leipzig. This material consisted of a brown, somewhat tenacious ointment-like mass, throughout which numerous crystals were distributed, and from which Dr. H. von Soden succeeded in isolating a colorless crystalline body, in form of glistening needles, melting between 146° and 147° C., and exhibiting a handsome blue fluorescence in alcoholic solutions. This body is identical with the citroptene of Crismer and the limettin which Tilden and Beck isolated from lime oil. It has the composition $C_{11}H_{10}O_4$, assigned by these investigators to their respective products, and is evidently identical also with the blue fluorescent crystalline body, melting at 145° C., described by H. E. Burgess (1901) as one of two new bodies isolated by him from lemon oil. Professor Schmidt's researches concerning the constitution of citroptene show it to contain two methyl groups: OCH_3 . On careful melting with potassium hydrate it yields phloroglucin and acetic acid. In confirmation of his previously-expressed opinion, citroptene must be regarded, in the light of the present investigation and results, as an isomer of dimethyl-aesculetin and of dimethyl-daphnetin, of which the structural formulas are exhibited in conclusion of the author's paper.—Arch. d. Pharm., 242, No. 4 (May 9, 1904), 288–295.

Cineol—Products of Reduction.—Cineol, which has heretofore been investigated in the direction of its oxidization products, has now received careful study by H. Thoms and B. Molle in reference to the products of reduction. They succeeded in its reduction by means of hydriodic acid in presence of mercury, obtaining a new hydrocarbon, $C_{10}H_{18}$, which they designate by the name of

Cineolene, and a polymerized hydrocarbon of the formula $(C_{10}H_{18})_x$. Cineolene has a sp. gr. at 18° of 0.8240, is optically inactive, and boils at 165° to 167° C. It does not form an addition compound with bromine, but splits off hydrobromic acid when the attempt is made. Under particular precautions it became possible, however, to include iodhydric acid, and in this roundabout way to obtain the alcohol $C_{10}H_{18}OH$. By the action of concentrated sulphuric acid, α -2-cymolsulphonic acid is formed, which was characterized by means of its barium salt.—Arch. d. Pharm., 242, No. 3 (April 8, 1904), 181–194.

Camphor—Formation in the Plant.—An interesting account is given by H. Shirasawa of the formation of camphor in the leaves and stem of the camphor tree. The oil cells appear very early under the vegetative point. In the young organs the oil cells contain an ethereal oil formed in the layer called by Tschirch the resinogenous layer, in which drops of the oil appear. In tropical regions the oil and the resinogenous mass in that

layer are thicker than in the temperate climate of southern Europe. The oil exists in larger proportion in the old than in the young leaves. The transformation of the oil into camphor does not take place for some time after the formation of the oil. In young wood the oil is more frequently yellow than in the old wood, in which also crystals of camphor are more abundant. More colorless oil and crystals are formed in the parenchyma than in other tissues. The oil cells do not exist in the woody parts, fibro-vascular bundles, nor in the epidermis, and there are more oil cells in the secondary than in the primary bark, but they are more abundant in the wood parenchyma than in other tissue. In the young pith they are numerous, but diminish in number by age. The autumn wood contains more oil than that of spring.—Pharm. Journ., Jan. 23, 1904, 77; from Bull. Coll. of Agricult., Tokio, through Rev. des Cult. Colon, 13, 369.

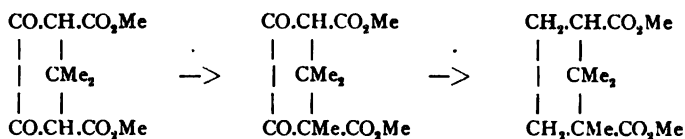
Synthetic Camphor—Industrial Production.—M. O. Forster observes that although nearly a year has elapsed since chemists learned that a process had been devised by which camphor may be prepared on a commercial scale from turpentine, specimens of the product do not appear to have reached the London market. Inquiry of leading brokers has elicited the fact that in this quarter "artificial camphor" still suggests the pungent, volatile substance of camphor-like consistency obtained by Klein in 1803 from turpentine and hydrogen chloride. Nevertheless the Ampère Electro-Chemical Company have constructed at Port Chester, in the neighborhood of New York, a plant by which turpentine may be transformed into camphor to the extent of nearly 30 per cent. The author illustrates his paper by half-tone pictures showing the actual operation, of which he gives the following description: Quantities of turpentine weighing about one ton are heated with anhydrous oxalic acid at 120° – 130° C. by means of superheated steam in a jacketed vessel; from this the product is then transferred to neighboring stills, where it is mixed with alkali and subjected to a current of live steam. The distillate is an oil containing camphor and borneol in solution, these being separated together by fractional steam distillation and drained from liquid associates in the filter-press. The crude mixture of camphor and borneol is then placed in an oxidizing tank containing chromic acid mixture, which oxidizes the borneol to camphor, this being separated from the spent liquor in a centrifugal machine. The product, now stained brown by the oxidizing liquid, is passed into a capacious sublimator, where, by means of dry steam, it is first freed from water and then volatilized; a current of air during the latter process carries the vapor into paper-lined barrels, where it condenses in the form of snow-white crystals.

The chemistry of the process is as follows: The $C_{10}H_{16}$ hydrocarbon, pinene, which forms the principal constituent of turpentine oil, is converted by the anhydrous oxalic acid into the half-bornyl ester of the latter, $C_{10}H_{17}O.CO.CO_2H$, which is solid at the ordinary temperature, and boils

at 157°–160° C. under 630 Mm. pressure; this compound, referred to by the patentees as pinyl oxalate is, strictly speaking, bornyl hydrogen oxalate. Simultaneously with this reaction, a portion of the oxalic acid behaves as it does when heated with glycerin, and yields formic acid, which converts some of the pinene into bornyl formate, $C_{10}H_{17}O.CH:O$, inaptly called pinyl formate in the patent; this ester is a colorless, oily liquid, which boils and decomposes at 160°–163° C. under 680 Mm. pressure. When heated with alkalis, bornyl hydrogen oxalate loses carbon monoxide and water, yielding camphor, while bornyl formate loses monoxide alone, furnishing borneol. The oily products consist of certain terpenes, associated with various oxalic and formic esters of terpenoid alcohols.—Chem. and Drugg., Feb. 13, 1904, 289.

Synthetic Camphor—Most Favorable Conditions of Formation.—Schindelmeier has investigated the most favorable conditions for the formation of camphor by the action of oxalic acid or pinene, and finds that the greatest yield of borneol is obtained when the temperature does not exceed 110° C. If the temperature be higher the amount of condensation-products formed is much larger. He states that the highest yield obtainable under most favorable conditions is 70 Gm. of borneol from 350 Gm. of pinene. It is suggested that this yield, apart from further loss in converting the borneol into camphor is against the remunerative production of synthetic camphor. He points out, too, that borneol may be produced economically from the oil of *Abies siberica*, which contains from 36 to 50 per cent. of bornyl acetate, which is easy to separate from the pinene and camphor present.—Chem. and Drugg., Mar. 5, 1904, 379; from Journ. Soc. Phys. Chim. Russ., 1903, 954.

Camphoric Acid—Synthesis.—Dr. Komppa having succeeded in producing camphoric acid synthetically, has supplied the final step for the preparation of camphor from its elements, since the conversion of camphoric acid into camphor was accomplished by Haller some years ago. Two years ago Dr. Komppa described the synthesis of apocamphoric acid, which differs from camphoric acid only in the presence of a hydrogen atom in place of one of the methyl groups. The methyl group cannot be introduced directly into apocamphoric acid, but the diketo-apocamphoric ester can be methylated and yields a diketo-camphoric acid which can be indirectly reduced to camphoric acid,



The synthetical acid is optically inactive, but proved to be identical with the known racemic form of camphoric acid. Although the correct-

ness of Bredt's formula for camphor has been fully established by the synthesis of several of its oxidation products, the synthesis of the ketone itself has for some years been one of the most attractive problems in organic chemistry, and its solution marks a distinct step forward.—Pharm. Journ., Jan. 23, 1904, 77; from *Berichte*, through *Nature*, 69, 259.

Farnesol—*A New Odorous Substance*.—Attention is directed in "*Chemiker Zeitung*" (1904, 307), to a new odorous substance which has been isolated from different essential oils, and named "farnesol." It occurs in cassia oils, and in the oil of ambrette seeds. To isolate it, it is best to use the fraction boiling at about 150° to 200° C. at 20 Mm. pressure. Oil of ambrette is first saponified to decompose the esters, and the crude farnesol obtained by a fractional distillation. One hundred grams are then mixed with 100 grams of benzene and 60 grams of phthalic anhydride, and the whole heated for several hours to 125° C. under pressure. The phthalic-acid esters are extracted with alkali in the usual way, decomposed, and steam-distilled. In this manner the pure farnesol is obtained as a liquid boiling at 155° to 165° C. at 10 Mm. It is a sesquiterpene alcohol, and has a sp. gr. 0.885 and a refractive index 1.4888.—Chem. & Drugg., April 9, 1904, 578.

Resins—*Method of Determining their Solubility*.—R. Dieterich employs the following simple method for determining the solubility of resins in different solvents: From 1 to 2 Gm. of the resin, finely powdered and previously mixed with washed sand or powdered glass, is wrapped or twisted up in a piece of filter-paper, which is then placed in a small muslin bag. The whole is then dried and weighed. It is then suspended in the solvent contained in a wide-mouth bottle in such a manner that the small packet is immersed half way up in the liquid and the solvent cannot get over the edges of the paper. After being left for twenty-four hours a fresh lot of solvent is used, the process being repeated until extraction is complete. The bag is then withdrawn, washed with fresh solvent, dried and weighed. Experiments conducted on dammar and olibanum with different solvents applied in this manner have given results which differ widely from those previously recorded.—Pharm. Journ., April 2, 1904, 466; from *Annales de Pharm.*, 9, 446.

Cuprum Abietinicum—*Preparation and Uses*.—The copper salt of abietinic acid ($C_{44}H_{64}O_3$) has been used with good results as a substitute for cupric oxide as an anthelmintic for dogs, having the advantage over the latter in not disarranging the stomach. It is given dissolved in castor oil, but the dose is not mentioned. It is obtained by saponifying rosin with soda and decomposing the soap with a dilute solution of cupric sulphate, collecting the precipitate and crystallizing it from its solution in ether. It forms brilliant green scaly crystals, which dissolve in the hydrocarbon and fixed oils with a splendid green color.—Pharm. Ztg., 48, No. 85 (Oct. 24, 1903), 865.

Oil of Cassia Farnesiana—Extraction and Constituents.—In continuation of their investigations of the essential oil of cassie flowers, Schimmel & Co. have isolated the oil from the Indian cassie pomade of commerce, which is produced from the flowers of *Acacia farnesiana*, and subjected it to examination. By the process described, 197 Gm. (=0.171 per cent.) of highly rectified oil, was obtained from 115 kilos of the pomade. This oil had the following constants: Sp. gr. at 15° C., 1.0475; optical rotation, +0°; index of refraction at 26°, 1.51331; saponification number, 176. Besides the methyl ester of salicylic acid, which has previously been detected in this oil, a phenol, which appears to be identical with β -cresol, and benzaldehyde, the oil was shown by this investigation to contain anisic aldehyde, whilst the exact determination of cuminic aldehyde, which is apparently present in minute quantity, has not yet been possible. Eugenol could not be detected in this oil.—Schimmel's Rep., April-May, 1904, 23-25.

Oil of Acacia Cavenia—Constituents.—The chemists of Schimmel & Co. have subjected the essential oil of *Acacia cavenia*, Hook. et Arn., to chemical investigation. This oil, which is prepared in the south of France by extracting the flowers with petroleum ether, is known in the trade as "Cassie Romaine." Like all flower extracts it is not a pure essential oil, but a salve-like mass consisting chiefly of odorless vegetable waxes and other extractive matter, and only a small part of oil, which can be driven off by steam. The sample serving for the present investigation was supplied by Mr. Jean Gras, of Cannes. On distilling 1.6 kilo of this product with steam, a brown oil with a strong cassie-like odor was obtained, of which the bulk could be dissolved in dilute caustic soda. The part soluble in the lye amounted to 94 Gm. and consisted of 73 Gm. eugenol, and 21 Gm. salicylic acid of the treatment with soda, after further steam distillation and rectification *in vacuo* amounted to 103 Gm. This was found to contain: benzyl-alcohol, geraniol, anisic aldehyde, eugenol-methyl ether, linalool (?), decylic aldehyde (?), and violet ketone (ionone, irone) (?). The anisic aldehyde has up to this time not been found in any flower oil; no other aldehydes or ketones could be detected with any certainty with the available material, but the pronounced violet odor of the higher fractions points to the presence in the oil of ionone or irone, or a similar violet-ketone.—Schimmel's Rep., Oct.-Nov., 1903, 18-21.

Acacia-flower Oils—Composition.—Walbaum has made an exhaustive investigation of the essential oils of some of the acacia-flower oils. The oil from the flowers of

Acacia Cavenia has the following composition: Eugenol = 40 per cent. to 50 per cent.; methyl salicylate, 8 per cent.; bodies not of a phenolic nature, 52 per cent. to 42 per cent. Among the latter bodies were found benzyl alcohol (about 20 per cent.), geraniol, anisic aldehyde, eugenol

methyl ether, linalool, decylic aldehyde, and a ketone of violet odor, probable ionone. From the oil of

Acacia Farnesiana the author separated benzaldehyde, methyl salicylate, benzyl alcohol, an aldehyde (probably decylic aldehyde), and a violet-smelling ketone. No eugenol was found.—Chem. and Drugg., Oct. 31, 1903, 732; from Journ. Prakt. Chem., 1903, 235.

Oil of Ajowan—Yield and Character.—Schimmel & Co. have distilled the volatile oil of ajowan. The yield of oil from the fresh herb cultivated on the grounds of this firm was 0.12 per cent. The light-brown oil had a specific gravity of 0.8601 (15°) and an optical rotation of $-0^{\circ} 41'$; it is soluble in about 6 vol. 90 per cent. alcohol, with abundant separation of paraffin. Contrary to the oil from the fruit, the oil from ajowan herb contains but very little thymol (about 1 per cent). Among other constituents the preliminary examination showed small quantities of phellandrene.—Schimmel's Rep., Oct.-Nov., 1903, 78.

Volatile Oil of Almond—Substitution by Benzaldehyde.—While there are no certain means for detecting an admixture of benzaldehyde, free from chlorine, when mixed with natural oil of bitter almond, its detection when insufficiently purified, depending on the presence of chlorine, is easy. The chemists of Schimmel & Co. have quite recently examined an oil of bitter almond sold for genuine oil which showed a powerful chlorine reaction, showing that in this case it was not even considered necessary to supply an oil free from chlorine, and a product of common quality, having a value of 3 marks per kilo, had been substituted.—Schimmel's Report, Oct.-Nov., 1903, 8.

Oil of Ambrosia Artemisiaefolia, L.—Yield and Constants.—Schimmel & Co. have obtained from the young, not-flowering plants of *Ambrosia artemisiaefolia*, L., about 0.15 per cent. of a green oil with a pleasant aromatic odor, which had the specific gravity 0.876 at 15° C.; $n_D = -1^{\circ}$; ester-number = 7.94. The oil makes a clear solution with an equal volume of 90 per cent. alcohol, which becomes cloudy when more solvent is added.—Schimmel's Rep., April-May, 1904, 96.

"Apopin Oil"—Constituents.—K. Kaimazu has made a chemical investigation of a Formosan oil, which the natives call "shu-yu" (evil-smelling oil), and to which Prof. Shimoyama has given the more appropriate name, derived from the district Aupin, of "apopin oil" (*Oleum apopinense*). The plant from which it is produced has not been specifically identified, but it undoubtedly belongs to the *Lauracea*. It appears to be produced in great quantities, and is said to be mixed by the natives with oil of camphor. The author gives elaborate details of his experiments, by which he has been able to determine "shu-yu," and isolate from it: as ketone, *camphor*; as oxide, *cineol*; as phenol-ethers, *safrol* and *eugenol*; as terpene, *dipentene*. The fraction 195° to 202° C. also contains a more

or less large quantity of *pinene*, but this he has not yet been able to isolate owing to lack of material. Linalool was searched for, but unsuccessfully.—Schimmel's Rep., Oct.-Nov., 1903, 10-13; from Journ. Pharm. Soc., Japan, No. 253, 1903.

"*Apopin Oil*"—*Formaldehyde a Constituent*.—In a further communication, Mr. Kaimazu reports on the separation and absolute identification of *pinene* in the apopin oil, the discovery of *formaldehyde* as a constituent, and a new terpene alcohol, $C_{10}H_{18}O$, which he has named *apopinol*. The discovery of the formaldehyde as a constituent may probably lead to a simple differential diagnosis between "shu-yu" and camphor oil, for, according to Gildermeister, camphor oil contains acetic aldehyde only—a fact which the author has confirmed in several samples of camphor oil. Although it has not been determined whether the formaldehyde in "shu-yu" is derived from the original material, or is formed by the method of production, its content in the oil is considerable, and its detection very easy. With regard to apopinol, the direct demonstration of its presence is not yet satisfactory, but by detecting citral the author was able to assume its presence indirectly. This apopinol is also valuable for the recognition of "shu-yu."—Schimmel's Rep., April-May, 1904, 10-23; from Journ. Pharm. Soc. Japan, 1903, No. 258.

Sweet Bay Leaf Oil—*Composition*.—H. Thoms and B. Molle communicate the results of a comprehensive investigation of the constituents of the volatile oil of the leaves of the sweet bay (*Laurus nobilis*, L.), which appear to be in some respects at variance with those obtained by Wallach in an examination of the oil of the leaves in 1889. According to Gildermeister and Hoffmann the leaves yield to distillation from 1 to 3 per cent. of volatile oil. This is a light-yellow liquid having an agreeable and strong odor, reminding at first of cajaput oil, but afterwards becoming sweetish. Its sp. gr. is 0.920 to 0.930; its optical rotation α_D —15° to —18°. From their researches the authors draw the following conclusions: The presumption of Wallach that the fractions boiling above 180° may contain *methyl-chavicol*, $C_{10}H_{12}O$, could not be confirmed. The acid reaction of the oil is due to the presence in the free state of *acetic*, *isobutyric* and *valerianic* (*isovalerianic*?) acids. It contains 1.1 per cent. of a free phenol, identified as being *eugenol*, which was also present to the amount of 0.4 in the form of a benzoyl ester. The ester number of the oil being 17 times as great as the acid number of the oil, it was possible to liberate the corresponding quantity of ester-acids, which are preponderatingly composed of acetic acid, with some valerianic and capronic acids—the latter in the relative proportions of 40 per cent. valerianic and 60 per cent. capronic acid. Besides these a *crystallizable solid acid*, having the formula $C_{10}H_{14}O_2$, was isolated to the amount of 0.07 per cent. This has not been identified with any of the known acids, but is presumably the product of secondary processes. The presence of *pinene*, as mentioned

by Wallach, was confirmed. *Cineol* (*eucalyptol*), which is also a known constituent, was found in the amount of 50 per cent. The fractions from 212° to 230° contain *geraniol*; it was possible also to obtain *terpinene*, $C_{10}H_{16}$, from these three fractions, by splitting off water, and *terpinhydrate* by means of dilute sulphuric acid. The higher-boiling fractions are oxygenated, and it is highly probable that these contain besides *sesquiterpene* also *sesquiterpene-alcohol*. The original oil, and particularly the high-boiling fraction, exhibit in glacial acetic acid solution, by the action of bromine vapor or very little nitric acid, an intense blue coloration.—Archiv. d. Pharm., 242, No. 3 (April 8, 1904), 161–181.

Oils of Bay, Coriander and Pimento—Modification of the Natural Products Necessary to Meet U. S. P. Requirements.—Dr. Geo. R. Pancoast calls attention to the statement of some of the distillers of volatile oils, that in order to meet the requirements of the present U. S. P. the oils of bay, of coriander and of pimento must be “modified.” Thus, in the case of

Oil of Bay, the U. S. P. (1890) gives the specific gravity, in practical agreement with Gildermeister and Hoffmann, from 0.965 to 0.990. Experimental data show that the larger part of the distillate obtained from bay leaves consists of lighter oils. Thus Kebler obtained from 511 lbs. of leaves $12\frac{1}{4}$ lbs. of oil having a sp. gr. of 0.9527, and only $\frac{1}{4}$ lb. of heavy oil, of sp. gr. 1.0196. There is reason to believe that in some instances the distiller reserves the lighter fractions for perfumery purposes and sells the heavier fractions, coming over from 0.965 to 0.990, for the U. S. P. article, the “perfumery oils” ranging from 0.958 to 0.9694. In the case of

Oil of Coriander, the U. S. P. requires the sp. gr. 0.870 to 0.885; Gildermeister and Hoffmann giving in addition to this the optical rotation $+8^{\circ}$ to $+13^{\circ}$, and solubility in 3 parts of 70 per cent. alcohol. Authentic specimens, distilled by Kebler, show the sp. gr. 0.869 and 0.872, optical rotation $+10^{\circ} 30'$, and complete solubility, while a commercial oil of coriander, which is quoted by the manufacturer alongside of the U. S. P. oil as “superior,” at three times the price of the official oil, has the sp. gr. 0.873, optical rotation $+12^{\circ} 17'$, and also complete solubility. With regard to

Oil of Pimento, the U. S. P. demands a sp. gr. of 1.045 to 1.055, while Gildermeister and Hoffmann give a wider range in specific gravity (1.024 to 1.050). Manufacturers quote oil of pimento U. S. P. and oil of pimento berries. The author examined eight lots with the results shown in the following table, Nos. 1 and 2, bearing the label, “made to conform to the U. S. P. requirements,” while lots Nos. 3 to 8 were pure oils, No. 8 being made by Kebler:

	Specific Gravity.	Optical Rotation.	Boiling Point.	
No. 1.	1.0494	—	—	Soluble.
No. 2.	1.0510	—	—	Soluble.
No. 3.	1.0280	—	—	Soluble.
No. 4.	1.025	6° 43'	190–250°	Soluble.
No. 5.	1.034	3° 50'	—	Soluble.
No. 6.	1.040	3° 48'	220–250°	Soluble.
No. 7.	1.030	6° 43'	215–251°	Soluble.
No. 8.	1.035	1° 54'	230–249°	Soluble.

The author concludes that the specific gravity of the three oils might be slightly lowered, as follows: *Oil of bay* to 0.950 to 0.980, thus including some of the “perfumery oils;” *oil of coriander* to 0.865 to 0.880, adding also the optical rotation of +8° to +13°; *oil of pimento* to 1.024 to 1.045, adding optical rotation lævorotatory up to –10° C., and boiling-point 190° to 250° C.—Merck's Rep., June, 1904, 157.

Pimenta Oil—Constituents.—Up to the present time, *eugenol* and an *unidentified sesquiterpene* have been the only constituents detected in pimenta oil. Schimmel & Co. now give the details of experiments by which they have determined the following additional constituents: *Cineol*, *phellandrene*, *caryophyllene*, *methyl-eugenol*, and *palmitic acid*.—Schimmel's Rep., April–May, 1904, 75–77.

Oil of Boldo Leaves—Characters and Constituents.—Tardy has examined the volatile oil of boldo leaves, which has hitherto not been examined except in a cursory manner by Hanauseck. The latter stated that it had a sp. gr. of 0.915, rotatory power –1° 40', and boiled between 175° and 250° C. Tardy distilled 12 kilos. of dry leaves, and obtained therefrom 200 Gm. of essential oil. This did not agree with the oil described by Hanauseck, which was probably adulterated. It has a sp. gr. 0.876, and a rotatory power –6° 30'. It was found to contain a trace of a phenolic body, boiling at 245°–250° C., and possessing the empirical formula $C_{10}H_{12}O_2$. It appears to be eugenol, but further examination is necessary to establish this fact. A very small amount of an aldehyde was separated, having all the properties of cumic aldehyde. A small amount of acetic esters was also separated. Two terpenes (at least) are present, of which one is pinene. An oxygenated body, $C_{10}H_{16}O$, was isolated by fractional distillation, and is probably terpinol. The higher-boiling fractions contain a lævorotatory sesquiterpene.—Chem. and Drugg., March 19, 1904, 460; from Journ. de Pharm., 1904, 132.

Essence de Bruyère—An Australian Aromatic Oil.—Schimmel & Co. have received an Australian oil, produced from an unknown plant, which is known as “essence de bruyère.” It has a pleasant aromatic odor, a pale greenish-blue color (traces of copper), and a specific gravity of 0.8587 at 15°; $n_D^{20} = +2° 44'$; soluble in 4.5 and more volumes 90 per cent. alco-

hol. They have not been able to learn anything with regard to the plant from which the oil is obtained.—Schimmel's Rep., April-May, 1904, 96.

Cajuput Oil—Specific Gravity Limit of the B. P.—John C. Umney calls attention to the fact that the importations of the oils distilled from the leaves of various species of *Melaleuca*, known under the general title of cajuput oil, seem to differ somewhat in physical character, and during the last few years it would appear that there has been a tendency to a slightly less specific gravity. Thus, in 1899 it was the exception rather than the rule for the sp. gr. of cajuput oil to fall below 0.922; but numbers of samples which he has recently examined, sent direct to London from Singapore or to Amsterdam from Macassar, have had a specific gravity as low as 0.919, and without any indication of abstraction of cineol. One can hardly conceive that there should be any reason for such abstraction during recent years, when the relative values of cajuput oil and eucalyptus oil, which contains high percentages of cineol, have been in favor of the former. Whether the low specific gravities of recent direct imports of oil from Macassar and Singapore are the result of a different species of *melaleuca* to that formerly used, or whether there is a difference in the method of distillation or rectification, is not certain; anyhow, the percentage of cineol is lower than it was some years since, and this results in a corresponding fall in specific gravity. The B. P., 1898, gives as a range of specific gravity, 0.922 to 0.930; the U. S. P., a limit of 0.922 to 0.929; the Japanese, Danish, Norwegian and Russian, from 0.910 or 0.915 to 0.930. The B. P. (as well as the U. S. P.) specific gravities would appear, therefore, to be of somewhat too narrow a range. As the medicinal value of the oil is probably entirely dependent on cineol, it would be a pity to fix a bottom limit for specific gravity lower than is absolutely necessary for normal oils, the author is of opinion that the specific gravity limits of the B. P. be extended from 0.919 to 0.930.—Chem. and Drugg., October 31, 1903, 725.

South Australian Cajuput Oils—Constants and Properties of Three Different Sorts.—Schimmel & Co. have received three South Australian cajuput oils, which are designated and described as below. These oils differ from the cajuput oils known up to the present, but no information concerning the plants yielding them was available. They are the following:

Cajuput Oil, blanc.— $d_{150} = 0.8908$; $a_D = +8^{\circ} 8'$; soluble in 0.5 and more volumes 90 per cent. alcohol. The colorless oil has a pepper-like odor, and probably contains cymol.

Cajuput Oil, vert.— $d_{150} = 0.8727$; $a_D = +32^{\circ} 40'$; soluble in 5 and more volumes 90 per cent. alcohol. The oil which was colored blue by copper, reminds by its odor, of amyl-alcohol and cineol; the latter could be detected in the oil by means of the iodol-reaction.

Cajuput Oil, larges feuilles.— $d_{150} = 0.8854$; $a_D = +9^{\circ} 7'$; soluble in

2.5 and more volumes 70 per cent. alcohol. The oil has a pale-green color, and is characterized by a very pleasant odor, resembling coriander; it is, therefore, probable, that the oil contains linalool.—Schimmel's Rep., April-May, 1904, 97.

Cananga Oil—Properties.—Schimmel & Co., having received from Mr. H. Williams, the Head of the Government Medical Depot at Bangkok, a cananga oil which had been distilled from the fresh and dried blossoms of cultivated cananga trees, report the following properties: The physical constants of this pale-yellowish oil were as follows: Sp. gr. at 15° = 0.9200; n_D^{20} = $-51^{\circ} 40'$; acid number = 1.82; ester number = 34.17. In 10 volumes 90 per cent. alcohol the oil was insoluble, but of 95 per cent. alcohol 0.5 volume sufficed for making a solution, which, however, again became turbid when more alcohol was added. The odor of the oil showed a great similarity to that of ordinary cananga oil, but left something to be desired with regard to delicacy. This drawback, though, may in future possibly be removed by a more rational method of production.—Schimmel's Rep., April-May, 1904, 18.

Roman Chamomile Oil—A Source of Angelic and Tiglinic Acids.—E. E. Blaise finds that the volatile oil of chamomile is a useful source of both angelic and tiglinic acids, and describes the following methods for their preparation: To isolate

Angelic Acid, 50 Gm. of the oil of Roman chamomile is shaken up with caustic potash, 50 Gm., water, 50 Gm., and wood-spirit, 60 Gm. After standing for several hours, the mixture becomes homogeneous. The wood-spirit is then distilled off *in vacuo*, water added to the residue, the oily supernatant layer removed, the aqueous portion shaken out with ether, and, after removing the ethereal layer, decomposed with a slight excess of sulphuric acid. The liberated acids are shaken out with ether, the solvent evaporated, and the residue cooled to 0° C., when a part of the angelic acid crystallizes out. The mother liquor, after separating these crystals, is fractionated *in vacuo*, and the portion distilling above 70° C. is again cooled, when more crystals are obtained. The fluid portion is then esterified with alcohol and sulphuric acid, and the mixed esters, consisting chiefly of isobutyric and angelic ethyl esters, fractionated under normal pressure; the angelic ester thus separated is again saponified, and its acid subsequently liberated by sulphuric acid and removed by shaking out with ether.

Tiglinic Acid was not formed by this process, but was liberated from α -methyl β -oxybutyric acid by dehydration, this methyl ester being obtained from a polymethyl-arkyl compound, which occurred as a white powder. The ethyl ester of this was treated with phosphorus pentachloride, then saponified, when tiglinic acid and a little angelic acid were obtained. 500 Gm. of oil gave 90 Gm. of angelic acid, 25 Gm. of iso-

butyric acid, and a larger yield of polymethyl-arkyl acid. The neutral compounds isolated from the same amount of oil comprised 30 Gm. of normal butyl alcohol, 25 Gm. of iso-amyl alcohol, 80 Gm. of active hexyl alcohol, 33 Gm. of anthemol, and 5 Gm. of a white insoluble powder. Isobutyl alcohol found by Koebig in the oil was not met with.—Chem. Centralblatt, 1903 (1), 1226.

Cassia and Ceylon Cinnamon Oils—Inadequate Distinction by Certain Color Reactions.—For the purpose of distinguishing between cassia oil and Ceylon cinnamon oil, F. Britton has recently recommended the following color-reaction: If a few drops of the oil to be examined are strongly shaken with a few Cc. water, the emulsion filtered, and a few drops of a 1 per cent. solution of sodium or potassium arsenite added to the filtrate, the liquid will acquire a characteristic green-yellow color if the oil is Ceylon cinnamon oil; cassia oil is said not to give this reaction. Schimmel & Co. have, however, found exactly the reverse to be the case. The filtrate of the Ceylon cinnamon oil remains completely colorless, whilst the filtrate of cassia oil acquires a faint green-yellow color. The want of intensity of this color-reaction, moreover, makes it unsuitable as a distinguishing method between cassia oil and Ceylon cinnamon oil. If it is absolutely desired to make use of a color-reaction as a means of distinction, the ferric chloride reaction should decidedly be preferred. This reaction is, as is well-known, carried out by adding a drop of ferric chloride solution to the alcohol of the oils; this produces in Ceylon cinnamon oil a green, in cassia oil a brown color. But Schimmel & Co. consider it desirable to dismiss the color-reactions altogether, as they are not entitled to the importance which is often attached to them. Generally speaking, the odor and the specific gravity should be sufficient indications whether it is a question of cassia oil, or of Ceylon cinnamon oil.—Schimmel's Rep., April-May, 1904, 22; Pharm. Ztg., 49 (1904), 107.

Another color-reaction for cassia oil is that recently recommended by Pool for the

Detection of Oil of Cloves in Cassia Oil by means of Jacquemin's phenol reaction; but Schimmel & Co. scarcely believe that this test has any advantage over the much simpler ferric chloride reaction above described. Moreover, in the case of a slight admixture of clove oil, differences of opinion as to the shades of color are certain to arise in either case. Pool's test is carried out as follows: 1 Cc. of a dilute aniline solution is decomposed with so much of a solution of sodium hypochlorite as is required to produce a violet color in the liquid, and a drop of the suspected cassia oil is then added, the mixture shaken, diluted with water and filtered. Pure cassia oil is said to give a bright violet filtrate, whitish in the presence of oil of cloves; the filtrate has a dark-green color.—Schimmel's Rep., April-May, 1904, 23; from Pharm. Weekbl., 40 (1903), 1101.

Oil of Cinnamomum Pedatinervium—Yield, Characters, etc.—E. Gould-

ing has published an examination of the essential oil from the bark of a tree indigenous to the Fiji Islands (*Cinnamomum pedatinervium*). The pulverized bark yielded on distillation with steam 0.92 per cent. of a yellowish-brown oil with a pleasant spicy odor. The oil is optically active $[\alpha]_D = -4^\circ 96'$; $n_{D15} = 1.4963$; in a refrigerating mixture it did not solidify. At ordinary pressure it distilled from 180° to 255° C. The saponification number was $4.4 = 1.5$ per cent. ester, calculated for linalyl acetate. After acetylizing the oil the saponification number had risen to 115.8, which proves that the oil contains about 30.75 per cent. free alcohols of the formula $C_{10}H_{18}O$. From the result of a methoxyl determination the content of 1.16 per cent. OCH_3 could be calculated. The chemical examination of the oil showed that the principal constituent (about 50 per cent.) is safrol; there were further detected about 30 per cent. linalool, 10 to 20 per cent. unknown terpenes, 1 per cent. eugenol, and about 3 per cent. eugenol methyl ether (?). The terpene fraction distilled from 167° to 172° C.; it had the specific gravity 0.8659 at 15° C., the specific rotatory power $[\alpha]_D = 17.72^\circ$ C., and yielded a liquid dibromide. From the linalool fraction citral was obtained by oxidation with chromic acid; this was proved by the conversion into α -citryl- β -naphthocinchonic acid. The eugenol obtained by extraction with dilute caustic soda-lye yielded the benzoyl compound melting at 70° C. The presence of safrol was proved by oxidation of the corresponding fraction into piperonal and piperonylic acid, and also by isolating the safrol- α -nitrosite (melting at 129° to 130° C.) according to Angeli and Rimini's method.—Schimmel's Rep., Oct.—Nov., 1903, 23; from Thesis (London), 1903.

Citronella Oils—Production in Jamaica.—H. H. Cousins has reported on Andropogon oils which had been produced at the Hope Experiment Station in Jamaica. In the distillation of the fresh grass of *Andropogon citratus*, D. C., one pound yielded one Cc. of a golden-yellow oil of the specific gravity 0.8897 at 60° F., and the optical rotation $-1^\circ 0'$ in a 20 Mm. tube. The yield in the distillation of the citronella grass, *Andropogon nardus*, was nearly three times as much; here, 2.9 Cc. oil were obtained from one pound fresh grass. The specific gravity of this oil was 0.8935 at 60° F., and the optical rotation $+17^\circ 0'$. As compared with the oils produced in Trinidad, the higher dextrorotatory power and lower specific gravity of the Jamaica oils are worthy of note.—Schimmel's Rep., Oct.—Nov., 1903, 27; from Jam. Bull. Dep. Agric., 1903, 49.

Citronella Oil—Adulteration with Alcohol.—Ernest J. Parry and C. T. Bennett have examined a recently-imported sample of citronella oil and disclosed an adulterant which, although easily detected on analysis, is of a very dangerous nature when an oil is sold as a "Schimmel's test" contract and is only examined in reference to its solubility. The adulterant was alcohol, which was present to the extent of 20 per cent., and had probably been added in order to make an already adulterated oil soluble, and thus pass "Schimmel's test." The oil had the following characters:

Sp. gr.....	0.899
Optical rotation.....	—12°
Refractive index	1.4578
Geraniol value.....	50 per cent.

On distillation under reduced pressure the oil commenced to boil so rapidly that the vacuum was broken and the distillate carried out at atmospheric pressure. Twenty per cent. was obtained in a steady stream, with the thermometer constant at 82°–83° C., after which it rapidly rose. The distillate was soluble in water to the extent of 95 per cent., the remaining 5 per cent. being oil mechanically carried over. The liquid at once yielded a large quantity of iodoform when treated in the usual manner, and boiled practically constantly at 80° C. It was, therefore, clearly alcohol mixed with some water, as probably a strong spirit had been used for the adulteration.—Chem. and Drugg., Dec. 26, 1903, 1061.

Citronella Oil—Petroleum and Adulterant.—Schimmel & Co. supplement a previous statement concerning the character of the adulterant of citronella oil employed in Ceylon, which they believed to be resin spirit. An examination of a very large quantity of citronella oil in this direction proves the adulterant to be petroleum. They find that the so called "Schimmel's test" (solubility of the oil in 80 per cent. alcohol) will also pass a really pure oil. Unfortunately, however, an oil may be adulterated to the amount of nearly 10 per cent. with *Russian petroleum*, and pass muster by this test, although even a small admixture of the difficultly soluble *American petroleum* is readily detected. The chemists of this firm have made a series of tests in this direction, embracing also the recently recommended method of Kelung Bamber, from which they conclude that the best way of meeting the present day adulteration of citronella oil with petroleum is to test the oil in the first place for its solubility in 80 per cent. alcohol (Schimmel's test), and then to repeat the test after adding 5 per cent. Russian petroleum. The Ceylon citronella oils should in the latter case have about the same solubility as the oil not mixed with petroleum, but the opalescence should be stronger; a separation of oil should, however, not take place in this case.

Bamber's Test, above referred to, is carried out as follows: A mixture of exactly 2 Cc. pure cocoanut oil free from acids, and 2 Cc. of the citronella oil to be examined, is shaken in a suitable graduated glass-tube, at 29° to 30° C., for one minute with 20 Cc. alcohol of 83 per cent. by weight ($d_{15}^{30} = 0.8273$), and is then centrifuged for $\frac{1}{2}$ to 1 minute. Whilst under these conditions, according to Bamber's statements, when pure citronella oil is used, the latter remains in solution, and only the cocoanut oil is separated again quantitatively, there would be, if the citronella oil contained an adulterant insoluble in alcohol, a corresponding increase in the volume of cocoanut oil, from which the quantity of the adulterant

could be immediately ascertained. By multiplying with 50, the percentage of the adulterant is found. In order to obtain correct results, it is, according to Bamber, especially necessary to use an alcohol of the strength mentioned by him, viz., 83 per cent. by weight. In doubtful cases he recommends to compare the oil to be examined with an authentic pure oil for its behavior towards Bamber's test. Bamber does not mention any results of tests whatever. The experiments of Schimmel & Co. with this test gave results which showed clearly that Bamber's method renders satisfactory services for the qualitative estimation of an oil, and in a few cases also shows an adulteration where the ordinary Schimmel test fails. With regard to the quantitative estimation of the adulterant, however, the new test is a failure.—Schimmel's Rep., April-May, 1904, 28-32; Proc. Chem. Soc., 19 (1903), 292.

Gingergrass Oil—Chemical Examination.—Schimmel & Co. have determined the following constants of gingergrass oil of apparently genuine quality: Sp. gr. at 15° C., 0.938; optical rotation, + 23° 40'; saponification number, 24; after acetylation, 166. Soluble in 2.3 parts of 10 per cent. alcohol, but becoming slightly cloudy on addition of more alcohol. It contains, besides small quantities of phellandrene, mainly *geraniol*, and an as yet *unknown alcohol*.—Schimmel's Rep., April-May, 1904, 56.

Lemongrass Oil from the Cameroon — Characters.—Mannich has distilled an oil from a species of *Andropogon* grown in the Cameroon, which resembles lemongrass oil in every respect, except that it has the lower sp. gr. 0.885, and is not soluble in 80 per cent. alcohol. It was found to contain 78 per cent. of citral. This oil, therefore, agrees with the Jamaica oils recently reported on by E. J. Parry, and also, to a certain extent, with the Trinidad oil. The solubility in 70 per cent. alcohol has always been insisted on for pure lemongrass oil, but it appears that this point will have to be reconsidered, especially when it is remembered that some of the oils containing very high amounts of citral are not soluble.—Chem. & Drugg., Sept. 26, 1903, 550.

Lemongrass Oil—Cultivation in Southern India.—A correspondent of the "Madras Mail" calls the attention of planters to the possibility of making a profitable side-industry out of the cultivation of lemongrass (*Andropogon citratus*) which grows freely on the hills in southern India. He thinks there is no doubt that a big industry may be established by the systematic cultivation of the grass and its collection for the purpose of distilling the oil by a more modern process than is now followed. A new pattern of still was recently constructed in Travancore and is said to work satisfactorily. At present Travancore has practically a monopoly of the Indian trade in the oil, though cultivation has recently been extended to the Cochin state.—Chem. & Drugg., Jan. 30, 1904, 188.

Oil of Cloves—Method of Valuation on the Basis of Eugenol-Content.

—In a lengthy paper, Professor H. Thoms reviews the various criticisms that have been made of the method proposed by him for the valuation of eugenol in oil of cloves, and admits that the method, which was devised when eugenol and caryophyllene were the only constituents recognized with certainty, requires modification in consequence of the recognition of other constituents in the oil. In the light of further experiments, which are given in some detail, the author, therefore, proposes the following method, which he finds satisfactory. Five Gm. of clove oil are heated on the water-bath with 20 Gm. of 15-per cent. soda solution for half an hour. After complete separation of the hydrocarbons, the solution of eugenol in the soda is run off through a separator, and the caryophyllene is washed twice with soda solution, the washings being added to the eugenol solution. This is now treated with 6 Gm. of benzoyl chloride in the usual manner, the reaction being completed on the water-bath. The crystalline mass is filtered off when cold and transferred to a beaker with 50 Cc. of water. It is then melted, well agitated to wash it, and allowed to cool again. This washing with 50 Cc. of water is repeated twice. The mass is then transferred to a beaker with 25 Cc. of 90 per cent. alcohol, and warmed till solution is complete. The beaker is then allowed to stand until the bulk of the benzoyl-eugenol has crystallized out in fine needles. It is next cooled to 17° C. and filtered through a paper (9 Cm. diam.) previously tared. The filtrate will measure about 20 Cc., and a small further quantity of alcohol is poured through to make the filtrate up to 25 Cc. The paper and benzoyl-eugenol are then transferred to a weighing-glass, dried at 101° C., and weighed. The allowance for 25 Cc. is 0.55 Gm. of benzoyl-eugenol, which must be added to the actual weight. The total eugenol, *both free and combined*, is then determined by simple calculation. If it is desirable to estimate the *free eugenol*, this may be done as follows: 5 Gm. of the oil of cloves are dissolved in 20 Gm. of ether, and this solution is quickly extracted in a separating funnel with 20 Gm. of 15 per cent. soda solution. The eugenol-sodium solution is then transferred to a beaker; the ether is washed with several portions of 5 Gm. soda solution of the same strength; the united eugenol-sodium solution and washings are heated on the water-bath to drive off the dissolved ether, and then benzoylized in the usual manner. The accuracy of the modified process was demonstrated by the author upon various mixtures of known eugenol and caryophyllene content.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 592–603.

Oil of Cochlearia Officinalis—Identity of that from the Seed with that from the Herb.—Gadamer having determined that the fresh herb of *Cochlearia officinalis*, L. (spoonwort) yields from 0.04 to 0.065 per cent. of volatile oil, but the dried herb a much smaller percentage than that calculated on the basis of loss in drying (see Proceedings, 1899, 676), Dr. W. Urban has undertaken the examination of the volatile oil of the seeds

with the object of ascertaining its identity with the oil of the herb—as seemed probable—and to utilize them if possible for the preparation of the *Spiritus cochleariæ*, Ph. G. (which see under Pharmacy). The best yield of oil from the dried herb was reported by Gadamer as 0.224 per cent., while Schimmel & Co. have only been able to obtain 0.18 per cent. Dr. Urban, following the method given by Gadamer, has determined the presence of 0.485 to 0.492 per cent. of volatile oil in the seeds, and this yield was not influenced by the addition of white mustard seed. The examination of the oil of the seed proved it to be identical with the oil of the herb, which, as is known, is *d*-butyl-mustard oil. Nevertheless, he finds that in older samples of spoonwort seeds, the addition of white mustard seed is favorable, since it evidently supplies the enzyme necessary to the hydrolyzation of the glucoside. Experiments made to isolate the glucoside from the seeds, have resulted in the yield of a crystalline body, the identity of which has, however, not yet been established.—Arch. d. Pharm., 241, No. 9 (Dec. 15, 1903), 691–695.

Cypress Oil—Characters, Constituents, and Specific Value in Whooping Cough.—The remarkably favorable results obtained by Professor O. Soltmann during a prolonged series of clinical experiments with cypress oil in the treatment of children for whooping cough, has been supplemented by an investigation concerning the constitution of this oil, carried out in the laboratory of Schimmel & Co. The value of this oil in the treatment of whooping cough was first pointed out by Dr. J. M. Bravo in the “Revista Médica de Chile,” in 1892, and good results have frequently been mentioned in the semi-annual “Reports” of the firm mentioned. In the summary of his work, “Keuchhusten and Cypress Oil” (Leipzig, March, 1904), Dr. Soltmann says that “in all cases of whooping cough, both in older and younger children, cypress oil reduces the number of paroxysms promptly and rapidly. It diminishes their intensity, prolongs the free intervals, removes the enfeebling after-effect of the paroxysm and single attack. No injurious action on the gastro-intestinal canal, respiratory tract, nervous system, heart, or kidneys has been observed; on the contrary, the complications which have risen from these are rendered less intense, or are partly removed, and their occurrence is generally prevented; it, therefore, shapes the whole course of the disease into a mild form.” The most remarkable fact, in this connection, is that the remedy is not administered internally. The treatment consists in sprinkling an alcoholic solution of the cypress oil, 1 part oil to 4 parts alcohol, four times daily on the coverlet, pillow and underclothing of the children. Concerning the chemical investigation of the oil, Schimmel & Co. observes that up to now only *d*-pinene and cypress camphor had been detected in cypress oil. On further examination, which is not yet completed, they find that cypress oil contains on test 65 per cent. of *terpenes*, of which the bulk consists of camphene and sylvestrene. No free *terpineol* was found in it. *Cymene* is

represented by 1 to 2 per cent.; *alcohol*, by about 8 per cent.; *esters*, especially of *terpineol*, by about 8 per cent. *Ketones* are only present in fractions of 1 per cent. and about 15 per cent. constitutes *cypress camphor*. The oil worked up had the following constants: Sp. gr. at 15° C., 0.8922; optical rotation = + 16° 5'; index of refraction at 20° = 1.47416; saponification number, 25.3; saponification number after acetylation, 50.5. These values correspond to a content of 8.8 per cent. of esters, $C_{10}H_{17}OCOCH_3$, and 7 per cent. of alcohols, $C_{10}H_{18}O$. The oil did not dissolve clear in 10 parts of 90 per cent. alcohol.—Schimmel's Rep., April-May, 1904, 36-42.

Dog-Fennel Oil—Constants, &c.—Schimmel & Co. have obtained about 0.1 per cent. of pale-yellow oil by distilling the flowering herb of *Eupatorium capillifolium* (dog-fennel), which agrees well in its constants with those previously given. Its sp. gr. at 15° C. is 0.926; optical rotation, $a_D = + 18^\circ 38'$; ester number, 7.11. Makes a cloudy solution with 3.5 and more volumes of alcohol. Has a high phellandrene content.—Schimmel's Rep., April-May, 1904, 96.

Oil of Erythroxylon Monogynum—Composition and Constants.—Schimmel & Co. obtained from the wood of *Erythroxylon monogynum*, Roxb., by distillation, about 2.56 per cent. of oil in the form of a sticky, crystalline mass, having a pleasant odor, reminding of oil of guaiac wood. The specific gravity is less than 1; melting-point = 42° to 45° C.; acid number = 6.77; ester number = 1.56; ester number after acetylation = 1.31. Soluble in 1 volume 90 per cent. alcohol with slight cloudiness, which disappears when more alcohol is added. For the purpose of examining the crystalline body, the last runnings of the oil were first of all submitted to distillation *in vacuo*, and the portion passing over between 212° and 216° C. (8 mm.), was frozen out from the smallest possible quantity of petroleum ether. After subsequently recrystallizing twice from petroleum ether, a compound of the melting-point 117° to 118° C., crystallizing in brilliant needles, was obtained, analyses of which gave results corresponding to the formula $C_{20}H_{32}O$. This requires further examination.—Schimmel's Rep., April-May, 1904, 97.

Eucalyptus Oils—Characterization of a Comprehensive Series.—Dr. E. M. Holmes calls attention to, and briefly describes, a magnificent series of specimens of the oils derived from 109 species of *eucalyptus*, which were recently presented, together with herbarium specimens and sections of the timber and bark, to the Museum of the Pharmaceutical Society of Great Britain, and serve to illustrate the progress that is being made in the scientific investigation of the natural products of Australia. Pharm. Journ., Febr. 13, 1904, 187-188.

Geranium Oil—Influence of Atmospheric Conditions on its Secretion.—P. Jeancard and C. Satie have compared the physical and chemical char-

acters of the volatile oil of *Geranium odoratissimum* produced under their supervision in the Cannes district, from representative specimens of the crops of 1901, 1902 and 1903. From the data thus obtained, they conclude that a succession of cold nights, such as occurred in 1903, diminishes the proportion of alcohols in the oil of geranium without, however, giving rise to a greater formation of esters, as was observed to be the case, under similar conditions, with neroli and petitgrain oils. The lower temperature, also, brought about a lower percentage yield of oil. Of the two alcohols, geraniol and citronellol, the amount of geraniol remained fairly constant, while the citronellol increased with the greater yield of oil. The physical constants showed but slight variation during the three years, and the amount of esters was not found to vary greatly. The difference in total alcohols showed no very great divergence, except in a few isolated instances where distillation was performed with plants which had been exposed to a succession of cold nights. Comparing these results with those obtained with distillations of neroli and petitgrain oils, it would appear that a period of low temperature invariably gives oils a low free-alcohol content.—Pharm. Journ., March 5, 1904, 325; from Bull. Soc. Chim., 31, 43.

Geranium Oil—Production on the Isle of Bourbon.—The "Rev. des Cult. Col." (14, 180) contains the following interesting information concerning Bourbon geranium oil: The species cultivated on the Isle of Bourbon is *Pelargonium capitatum*, *ait.* It is grown at an altitude of 400 to 1,200 meters. Above this elevation the plant is killed by frost. In this zone extensive clearings have been made, and in the thick layers of humus exposed the plant grows luxuriantly. A kilogramme of oil is obtained from 700 to 1,000 kilos. of leaves, and when freshly distilled is of a green color. About 250 stills are still in operation. Until last year the industry was not taxed, but now a duty of 10 francs per still has to be paid. The leaves, after distillation, are used as manure for potatoes, with excellent results.—Pharm. Journ., May 14, 1904, 649.

Réunion Geranium Oil—New Constituents.—Utilizing the first runnings of 30 kilos. of geranium oil from Réunion, which had been collected in five fractions of 1 kilo. each, for an examination of the constituents of that oil boiling lower than citronellol and geraniol, Schimmel & Co. have determined as additions to the previously known constituents of geranium oil, namely, geraniol, citronellol, menthone, tiglinic acid, fatty acids and a paraffin of the melting-point 63° C., the following four constituents: *Amyl alcohol*, *pinene*, *phellandrene* and *linalool*. By far the largest part of these fractions consisted of menthone, which had already been found by Flatau and Labbe, and of linalool, the presence of which had been suspected but not proven by those authors.—Schimmel's Rep., April-May, 1904, 55.

Oil of Grindelia Robusta—Yield and Properties.—According to Heinr.

Haensel's Report (July, 1903), the dried herb of *Grindelia robusta* when distilled with steam under pressure yields 0.28 per cent. of a dark-brown, volatile oil, having a peculiar and strong, but not exactly pleasant odor. Its sp. gr. at 15° C. is 0.9582; its optical rotation, calculated from that of its alcoholic solution on account of its dark color, is $-8^{\circ} 08'$. It forms clear solutions with ether, amyl alcohol, and chloroform, but turbid solutions with alcohol, benzol, and bisulphide of carbon.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 574.

Oil of Hyptis Spicata (Poir) Brig.—*Constituents and Constants*.—Schimmel & Co. have obtained from *Hyptis spicata* (*Mesosphaerum spicatum*), a plant growing abundantly in Florida, a very small quantity (about 0.005 per cent.) of a bright-yellow oil with a faint mint-like odor: $d_{150} = 0.915$; $a_D = -27^{\circ} 25'$; acid number = 2.17; ester number = 4.35; insoluble in 10 volumes 80 per cent. alcohol; further determinations of solubility could not be made, owing to lack of material. To judge from the odor, it is probable that the oil contains small quantities of menthone or pulegone.—Schimmel's Rep., April-May, 1904, 96.

Volatile Oil of Iceland Moss—Characters.—That Iceland moss contains a volatile oil is probably not generally known. H. Haensel has obtained 0.051 per cent. of a brownish volatile oil by steam distillation, which has a pleasant, peculiar odor and taste, an acid reaction, and deposits crystals on prolonged standing. Another new oil, obtained by steam distillation is the

Volatile Oil of Burdock (*Arctium Lappa*).—It is yielded in the amount of 0.065 per cent., has a brown color, a peculiar agreeable odor, bitter taste and acid reaction. The special characters of these two oils may be consulted in Haensel's Report for October, 1903.

Kobushi and Yomugi Oils—Two Japanese Novelties.—Schimmel & Co. described two interesting oils received from Japan, the one the product of a *magnolia* and the other of an *artemisias*.

Kobushi Oil is obtained from the fresh leaves and branches of the Kobushi tree (*Magnolia kobus*, D. C.) in a yield of about 0.45 per cent., has a bright-yellow color, and possesses the following properties: $d_{150} = 0.9642$; $a_D = -1^{\circ} 6'$; acid number = 1.5; ester number = 8.87; soluble in 1.2 vol. 80 per cent. alcohol; the greatly diluted solution shows opalescence. The odor of the oil reminds of sassafras oil, and gives rise to the presumption that it contains a large proportion of saffrol; the oil also contains among others small quantities of citral. The species of magnolia which yields this oil occurs chiefly in the central districts of Japan; the distillation of the oil takes place from July to September.

Yomugi Oil is derived from *Artemisia vulgaris* L., has a bright green color, and a powerful cineol odor. The constants of the oil are as follows: $d_{150} = 0.9101$; $a_D = -13^{\circ} 6'$; acid number = 1.56; ester number =

29.81. The oil does not completely dissolve in alcohol, as the dilute solution shows opalescence or cloudiness even when absolute alcohol is employed. The presence of cineol in the oil was proved by the iodol compound; thujone is probably also produced.—Schimmel's Rep., Oct.-Nov., 1903, 78.

English Lavender Oil—Non-Compliance with the B. P. Requirements.

—John C. Umney states that the methods of distillation of lavender oil in vogue, both in the South of France and also in the Mitcham district of Surrey, may be described as primitive. Distillations are conducted, as far as he has been able to ascertain, much in the same way as they have been for the last fifty years. It is the custom of the large distillers at Mitcham to separate lavender oil distillates into two portions, this separation not being based upon any definite chemical characters, but upon practical experience, since the last runnings of the still are not so pleasant as the first, although the portions set aside as "second runnings" are anything but uniform. It comes about, therefore, that many of the English oils are not normal distillates of lavender—that is to say, they are not the whole of the essential oil distilled from lavender, but in a sense fractionated oils, which in many instances have a sp. gr. below 0.885. By the courtesy of Messrs. J. & G. Miller, of Mitcham, the author has been given the opportunity of making observations upon oils of lavender of their production. Operating upon a charge of $1\frac{1}{2}$ tons of lavender, freshly cut, with 1,200 gallons of water, and allowing the distillation to proceed for three hours (which is the usual time method adopted), and subsequently pushing the distillation to a finish, one is able to obtain distillates which are divided into two parts, the second fraction varying from 4 to 8 per cent. of the final oil obtained. In this way he divided and examined oils distilled in the years 1901, 1902 and 1903, and the sp. gr. of these oils, with their percentages of esters calculated as linalyl acetate, are set out in the subjoined table:

		Sp. gr. at 15° C. when first examined.	Present sp. gr.	Present percentage of Esters.
1901	1st distillate.....	0.881	0.886	6.2
	2d distillate.....	0.884	0.889	7.3
1902	1st distillate.....	0.882	0.885	8.1
	2d distillate.....	0.887	0.890	12.0
1903	1st distillate.....	0.881	0.881	8.2
	2d distillate.....	0.889	0.889	12.0

From these figures it will be noted that the percentage of esters contained in the second fractions is higher than in the first. This is what one

would expect taking into consideration the relative boiling-points of the constituents, but, judged by smell, in every instance the second fraction is decidedly less pleasant than the first, the selection of the products as practiced by the distillers being for trading purposes fully confirmed. In the author's opinion the difference in these fractionated distillates, however, is due rather to the presence of decomposition products in the second. Previous examination, from 1897-1901, of lavender oils produced at Elsenham, which, however, had not been divided into two portions, gave specific gravities ranging from 0.885 to 0.891 at 15° C., conforming in every instance with the B. P. requirement. In the light of these and other observations the question arises, "Should the character and tests of the B. P. be maintained, or should the minimum sp. gr. be somewhat lowered?" The question is somewhat difficult to answer, but in the opinion of the author it would be better to reduce this sp. gr. limit to 0.833.—Chem. and Drugg., Nov. 14, 1903, 825.

Spike Oil—Adulteration with Safrol.—E. J. Parry and C. T. Bennett state that large quantities of spike oil have recently appeared on the market, which they have good reason to believe has been specially prepared so as to pass the ordinary tests to which spike oil is usually subjected. The sp. gr., optical rotation and solubility are within the limits given by most authorities for this oil, but a fuller examination reveals the presence of some one or more foreign bodies. The sp. gr. of pure spike oil is somewhat variable, so that in this respect no alteration in the usually adopted figures of, say, 0.904-0.915 is possible. The optical rotation is usually given as up to +7°. They have generally found that samples with a rotation over +5° are very suspicious, and that +4° is the usual upper limit. The solubility figure, however, requires some revision. Instead of 70-per cent. alcohol, the authors propose that the solubility test should be reduced to six volumes of 65-per cent. alcohol. They also think it necessary that a fractional distillation be made, and the various fractions examined, to guard against the addition of carefully-prepared mixtures which might pass the requirements heretofore demanded. The usual adulterants are turpentine oil, oil of rosemary of the commonest quality, and safrol. In a sample examined recently a fraction was obtained boiling between 230° and 240° C. which had a sp. gr. of 0.986, was optically inactive, and had a refractive index 1.4980. Its odor was very marked, and was sufficient to identify it as being chiefly safrol, with which the physical characters are in complete accord. A fractional distillation reveals practically any adulterant that is likely to be added to spike oil in sufficient quantity to be remunerative. The percentage of esters and alcohols present should also be determined, as these figures will give useful information if rosemary oil is suspected.—Chem. and Drugg., Dec. 19, 1903, 1011.

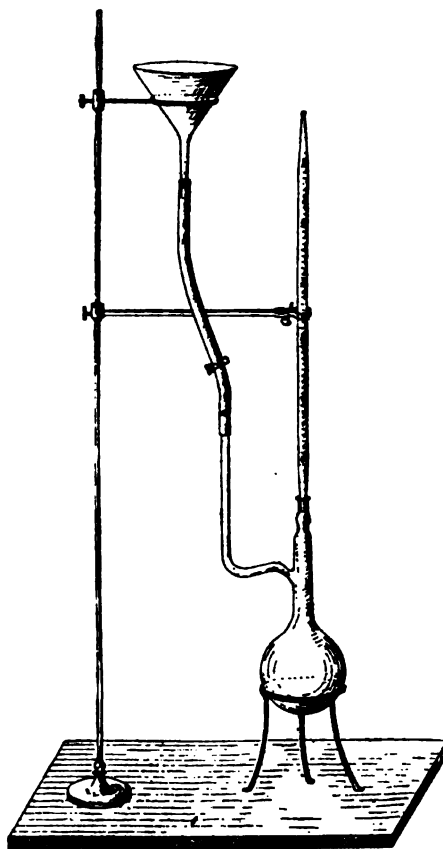
Lemon Oil—Citral Value.—Many disputes having of late arisen upon

the question of the percentage of citral in lemon oil, Dr. S. Gulli and H. Stavenhagen have collected the results obtained during the last few years in the examination of hundreds of samples of pure and commercial lemon oils, and summarized them in four tables, showing the specific gravity, optical rotation, and citral content of the oils obtained at different dates and from different districts during the seasons of 1900, 1901, 1902, and 1903. These results prove that pure lemon oil contains from 7 to 7.30 per cent. of citral with few exceptions, these being in the case of oils obtained in an abnormal season, when the percentage of citral may become as low as 6.30, and rarely less than 6.50 per cent. It is only according to such percentages that commercial bargains are concluded at Reggio-babria, and if the percentage is less than 6.50, lemon oil is refused, for it is suspected to be adulterated.—Chem. & Drugg., Aug. 20, 1903, 401.

Lemon Oil—Method of Citral Estimation.—Referring to the controversy concerning the percentage of citral in lemon oil, Dr. Berté expresses the opinion that low aldehyde percentages are possibly due to the method of determination employed, and strongly recommends the estimation method previously published by him in conjunction with Professor Soldaini, which he now describes explicitly, accompanied by an illustration of the apparatus required (Fig. 63), as follows: Potassium bisulphite should be used instead of sodium bisulphite, and in order to obtain comparable results the process should be carried out always in constant conditions. By means of a pipette or a cylindrical tube divided into fortieths of a cubic centimeter, 5 Cc. of oil is exactly measured at a determined temperature and transferred into a fractional-distillation flask of about 100 Cc. capacity. This flask is carefully ground at its neck, so that it may closely fit the pipette-shaped tube when turned upside down in it, and bears a lateral tube bent upwards, to which is connected a piece of rubber tube, closed up by a pair of pincers. The pipette tube is then accurately cleaned, dried and fitted (upside down) into the neck of the flask, wherein 25 Cc. of a saturated solution of potassium bisulphite, with slight excess of sulphurous gas, has previously been introduced. The mixture is shaken up to emulsify, heated for ten minutes in a water-bath, agitating frequently and almost continually, and taking care that it does not get so hot that the bottom of the flask cannot be rested on the hand. After cooling by repeated shaking, it is again heated in the same way for five minutes, shaking well to emulsify and allowing to completely cool. Then the lateral tube of the flask is connected up to a funnel resting on a support, from which water can be run at will into the flask by means of the pair of pincers fitting into the rubber tube. A little water is let in, and more added at repeated intervals, keeping on shaking, until the floating layer of oil comes up to the beginning of the neck of the flask, wherein the operator strives to gather, by means of little knocks, the little drops that may eventually adhere to the sides of the flask. Having thus, as

thoroughly as possible, brought the floating oil between the beginning of the neck of the flask and its lateral tube, water is all at once run in, in such a way as to raise the lower limit of the oily layer beyond the zero-mark of the pipette's scale. With the help of the little knocks aforementioned, and by causing little bulbs of air to get in through the lateral tube, the little drops of oil that have eventually remained behind adherent

FIG. 63.



Apparatus for the Estimation of Lemon Oil.

to the sides of the flask are dragged along up to the surface, and the whole of the oil is gathered into the graduated portion of the pipette, where its volume is read off, after having allowed it to become perfectly transparent. The number of division-marks wanting to make up 5 Cc., divided by 2, will give the *volume percentage of the aldehydes fixed by the potassium acid bisulphite*, which can afterwards be converted into percentage by weight.—Chem. and Drugg., Oct. 31, 1903, 753.

May Oil—A Porto Rican Product.—Schimmel & Co. have received a distillate, originating in Porto Rico, obtained from *Calyptanthes paniculata* Ruiz et Pav. belonging to the Myrtaceæ. The oil, which resembles lemon-grass oil, had the specific gravity (15° C.) 0.9509, and an optical rotation of $-1^{\circ} 52'$. It dissolves very readily in 80 per cent. alcohol, but in 70 per cent. alcohol the solubility is incomplete. The oil contained 62.5 per cent. citral.—Schimmel's Rep., April-May, 1904, 95.

Oil of Mentha Citrata, Ehr.—Constants.—Schimmel & Co. have examined two oils distilled in Florida from *Mentha citrata*, a plant known as "bergamot mint." One of these oils obtained to the amount of about 0.2 per cent. from young, not flowering, but fresh plants (without roots), had a pale-yellow color and a pleasant odor reminding even more of lavender oil than of bergamot oil. $d_{150} = 0.8826$; $n_D = 5^{\circ} 35'$; ester number = $31.28 = 10.95$ per cent. linalyl acetate; soluble in 2 and more volumes 70 per cent. alcohol. The second oil is obtained from the "frozen" (? Rep.), in about the same yield, and differed in its properties from the above-mentioned oil. $d_{150} = 0.8895$; $n_D = -1^{\circ} 41'$; ester number = $111.28 = 38.95$ per cent. ester (calculated for linalyl acetate); soluble in 2 and more volumes 70 per cent. alcohol. In consequence of the higher ester content, the odor of linalool was here more pronounced than in the previous oil.—Schimmel & Co., April-May, 1904, 96.

Oil of Monarda Citriodora—Yield and Character.—I. W. Brandel has obtained from the dried flowing herb of *Monarda citriodora* about 1 per cent. of a reddish oil, having the sp. gr. 0.9437 at 20° C. Chemical examination has shown this oil to contain carvacrol and its oxidation product hydro-thymoquinone. The red color of the oil indicate the presence of thymoquinone as well, with which it is at least in part united as thymo-quinhydrone. Whether cymene or citral are present, remains to be determined when a better supply of material is at hand. Tests for the presence of limonene and phellandrene gave negative results.—Pharm. Rev., 22, No. 4 (April, 1904), 153-155.

Nutmeg Oil—Constitution of Myristicin.—Semmler, who isolated myristicin from nutmeg oil in 1890, gave to it the formula of a butenyl-methylene-dioxy-methoxybenzene. An examination by Thoms, however, shows that instead of a butenyl group, this body contains an allyl group. The

Myristicin examined had the following constants: sp. gr. at 19° C., 1.1425; boiling-point, 149.5° C., at 15 Mm. By the action of alcoholic potash the allyl compound could be changed into the propenyl compound.

Isomyristicin, which, in distinction from myristicin, is solid, and melts at 44° to 45° C. In addition, there was formed, by splitting up the methylene linking, a very small quantity of a phenol. Myristicin and isomyristicin also differ in a marked degree in their behavior towards bromine. The first-named forms an oily product when submitted to the action of two

atoms bromine, the last-named a crystalline product of the melting-point 109° C., which is identical with the one obtained by Semmler. If to the myristicin or isomyristicin dissolved in glacial acetic acid, and cooled in ice, bromine is added up to the formation of a permanent yellow color, there are formed in both cases disubstituted dibromides. The dibromomyristicin dibromide melts at 130° C., and the dibromiso-myristicin dibromide at 156° C. By reducing the myristicin with sodium in alcoholic solution, dihydro-myristicin (boiling-point, 149° to 150° C., at 17 Mm.) is obtained. In this case, analogous to isosafrol and isoapiol, the methylenedioxy-group is split up, and *propyl-methoxy-phenol* is formed. This has the sp. gr. 1.0598, at 20° C., and boiling-point, 160° to 161° C. at 17 Mm. By oxidizing iso-myristicin with potassium permanganate according to Semmler, the author also obtained

Myristicin Aldehyde and Myristicin Acid.—The aldehyde has the melting-point 131° C.; the acid melts at 210° C.—Schimmel's Rep., April-May, 1904, 65; from Berl. Berichte, 36 (1903), 3446.

South American Orange Oil—Characters and Value as Perfume.—John C. Umney and C. T. Bennett make an elaborate report on the examination of a sample of orange oil which was received from Buenos Ayres without any description as to its source. A preliminary examination of this sample showed that its characters more closely resembled those of orange-leaf than of orange-flower oil, but the odor was so decidedly pleasant that it was considered advantageous to obtain further shipments of the oil, an extended analysis of which has now been conducted. The oil has much resemblance to the ordinary Paraguay variety of petitgrain oil, but appears to have a more delicate odor and contains a higher percentage of free alcohols and a lower percentage of esters than a normal Paraguay oil. This may be accidental or not very constant, but it seemed worth while to make a more complete examination of this oil, especially as an examination of a Chinese neroli oil had previously been conducted, on which a paper was read at a meeting of the British Pharmaceutical Conference at Dundee in 1902. The most noticeable feature in connection with this oil was the absence of more than traces of the most characteristic constituent of neroli, viz., methyl anthranilate. At all events, this ester does not exist in sufficient quantity to be separated by Erdmann's method, although fractions showing a blue fluorescence have been obtained. The general characters of this oil, shown in comparison with those of Chinese neroli oil, French neroli oil, and petitgrain oils, are set out in the subjoined table:

	South American Oil.	Paraguay Petitgrain Oil.	French Petitgrain Oil.	French Neroli Oil.	Chinese Neroli Oil.
Specific gravity.	0.887	0.891	0.885 to 0.900	0.870 to 0.880	0.850
Optical rotation.	+ 2°	+ 0° 30'	— 2° about	+ 1° to 5°	+ 35°
Esters as linalyl acetate.....	36.5 p. c.	52.4 p. c.	50 to 75 p. c.	10 to 20 p. c.	4.79 p. c.
Free alcohols as geraniol.....	38.4 p. c.	18.9 p. c.	25 to 35 p. c.	20 to 25 p. c.	21.4 p. c.
Total alcohols..	67.1 p. c.	60.0 p. c.	.....	.....	25.17 p. c.

The paper also gives several tables exhibiting the results of fractionating the oil and some preliminary remarks concerning its constituents, which will be the subject of further investigation.—Pharm. Journ., Febr., 1904, 217-218.

Oil of Petitgrain—Influence of Climatic Variations on Constants.—Jeancard and Satie have communicated a paper on oils of petitgrain, which they have examined for several years, and attempt to show that the climatic variations, &c., have some definite influence on the constants of the oils. The following are the mean figures for the past five years :

	1899	1900	1901	1902	1903
Specific gravity.....	0.8906	0.8884	0.8911	0.8916	0.8880
Rotation	—4°6'	—4°58'	—4°55'	—3°44'	—1°28'
Solubility in 70% alcohol....	1 in 3	1 in 3	1 in 3	1 in 2.9	1 in 3.8
Saponification value	159.6	156.8	154.7	158.9	141.0

The authors claim that a low temperature assists the process of esterification and retards the formation of free alcohols.—Chem. and Drugg., Febr. 20, 1904, 310; Bull. Soc. Chim., 1903, 1088.

French Parsley Oil—Myristicin a Constituent.—When producing apiol from French oil of parsley seed, Schimmel & Co. came across an oil which contained only small quantities of apiol in the last runnings, whilst the principal fractions could not be made to solidify. At the request of this firm, Prof. Thoms has examined this oil in detail, and reports on it as follows: The oil ($d = 1.017$; $[a]_{D_{20}} = 5.70$) was mixed with ether, and was freed from acids, phenols and aldehydes, by shaking with 5 per cent. solution of sodium carbonate, 2 per cent. potash liquor, and sodium bisulphite solution. The oil after treatment in this way was fractioned. In the individual fractions the following bodies were detected: *pinene*, as nitroso-chloride, and *myristicin*, as dibrom-myristicin dibromide. The myristicin found proved to be identical with the myristicin from oil of nut-

meg (which see), and, like the latter, it yielded *isomyristicin*. *Apiol* could be obtained from the last fraction of the oil of parsley seed by freezing. The latter, which is the principal constituent of German oil of parsley seed, differs from myristicin by the fact that it contains an additional methoxyl group. Inasmuch as the inability of the French parsley of adding another methoxyl group cannot be explained by a difference in the anatomical construction of the fruit, Prof. Thoms desires to determine by cultivation-test whether perhaps external causes contribute towards the difference observed in the two oils.—Schimmel's Rep., April-May, 1904, 67; Berl. Berichte, 36 (1903), 3451.

Patchouli Oil—*Chemical Investigation*.—Up to the present time, little was known of the chemical composition of patchouli oil, the only two constituents described being cadinene and patchouli alcohol, neither of which are of importance, in so far as the extraordinary characteristic and powerful odor of patchouli oil is concerned. With the object of clearing up the chemical constitution of this oil, Schimmel & Co. have conducted a thorough examination of patchouli oil of their own distillation, unfortunately, with great expenditures of material, and but little result so far. The oil had the following constants: $d_{15} = 0.9769$; $a_D = -55^\circ 45'$; acid number, 2.2; saponification number, 4.2; saponification number after acetylation, 15.4. The color was dark brown. 1 volume and more of 90 per cent. alcohol made a clear solution with the oil. A test for compounds containing methoxyl, made with the original oil according to Zeisel's method, showed no reaction. About 97 per cent. of the patchouli oil consists of bodies which are almost valueless for the odor. Of this, about 40 to 50 per cent. belongs to the portions distilling between 260°C . and 280°C ., which consist chiefly of one or more sesquiterpenes. The remainder is probably represented by

Patchouli Alcohol, which, probably representing the bulk of the oil, is present in the portions boiling above 140°C . (8 Mm. pressure). After repeated recrystallization from petroleum ether, it forms a colorless compound melting at 56°C ., which in the pure state may possibly be odorless. The specific rotation, calculated from a 23.94 per cent. chloroform solution, was $-97^\circ 42'$. In spite of a recrystallization repeated 6 times, they were unable to remove a faint musty odor, which, of course, is so characteristic of patchouli oil. The hydrocarbon patchoulene, which is formed from the alcohol already at ordinary temperature by the action of strong formic acid or other agent abstracting water, is a colorless liquid of a cedar-like odor, which has the boiling-point 255° to 256°C . The specific gravity of the body distilled over sodium was (contrary to Wallach's statement) 0.9334, the optical rotation $-36^\circ 52'$. They were unable to produce solid derivatives of patchoulene, such as the alcohol, a nitrosite, nitrosochloride or nitrosate. On oxidation with 1 per cent. permanganate solution, an oily product was formed, which was not examined further. The

question whether the sesquiterpene, which is readily formed from patchouli alcohol, is present in patchouli oil, can only be settled by further examinations. The pre-existing

Sesquiterpenes, after distillation over sodium, had specific gravities fluctuating between 0.9217 and 0.9379, the rotatory power between $-27^{\circ} 37'$ and $40^{\circ} 37'$. Notwithstanding repeated endeavors, the cadinene found by Wallach could not be detected in the fractions boiling between 240° and 278° C. Other constituents of patchouli oil found in the course of this examination were benzaldehyde (traces), *eugenol*, *cinnamic aldehyde* (traces), a *terpinic alcohol*, and a *ketone*, with a caraway-like odor; also in small quantity. The important constituent, however, in the present investigation designated as

The Base is a body which is remarkable on account of its stupefying odor. It was found in all the lower and also in the sesquiterpene fractions in a smaller or greater degree, when the portions boiling at 250° to 270° C. were treated several times with 20 per cent. sulphuric acid. The base was liberated from the acid solution by means of soda, and driven off with steam. It has a lower specific gravity than water, and is readily volatile with water vapor. The water oil appears to contain in it more abundant quantities than the normal oil. From a portion of 6 to 7 kilos of the first-named oil we abstracted about 10 Gm. base. On purification of the latter though, it was found that the bulk of it had a higher specific gravity than water, and had a less powerful odor than the first. Distillation *in vacuo* led to the following two fractions:

80° to 130° C., and 135° to 140° C. (3 to 4 Mm. pressure).

The first portion, amounting to 2 Gm., yielded in absolute ethereal solution with dry hydrochloric acid a strongly hygroscopic, partly somewhat greasy hydrochloride melting indistinctly at 105° to 115° C. Its aqueous solution yielded with platinum chloride a well-crystallizing platinum salt. Melting-point, 208° C., after recrystallizing 3 times from water. The salt dissolves with great difficulty in alcohol and ether. The second portion of the base (8 Gm.), boiling at 135° to 140° , had the sp. gr. 1.0148, the optical rotation $\alpha_D = -9^{\circ} 5'$, the index of refraction, at 20° C., 1.54282. Its platinum double salt could not yet be obtained sufficiently pure for analysis, but may possibly melt lower than the one mentioned first. In alcohol it dissolves fairly easily. Further tests are being made with both bases. Schimmel's Rep., April-May, 1904, 68-71.

Patchouli Oil—New Adulterant.—W. H. Simmons has recently examined two samples of patchouli oil which were evidently adulterated, not with cedarwood or cubeb oil, but with an ester or ester-containing oil. Analyses gave the following figures:

	A	B
Specific gravity 15°C.	0.9948	0.9937
Rotation, a_D 15°C.	$-38^{\circ}30'$	$-49^{\circ}30'$
Refractive index at 20°C.	1.5175	1.5110
Acidity	trace	trace
Saponification number	58	18.5
Solubility in 90 per cent. alcohol	1 in 0.75	1 in 0.5

In both cases the sp. gr. is slightly high, but not abnormal, the rotation of A distinctly low, and the refractive index of both somewhat high, the figures found by the author for pure patchouli oil ranging from 1.5064 to 1.5101. The most noteworthy figure in each, however, is the high saponification number, and the author has endeavored to determine the nature of the ester responsible for it. After boiling with potash, the unsaponified oil was separated, the rest acidified and distilled, when with A a very distinct quantity of benzoic acid was obtained, together with a small amount of volatile fatty acid, while B gave some volatile fatty acid, but no benzoic acid. Sample A is evidently adulterated, but the presence of a small amount of saponifiable matter in B may be the result of a defective process of distillation or the use of leaves admixed with foreign matter.—Chem. & Drugg., May 21, 1904, 815.

Oil of Peppermint—Increase of Menthol by Chemical Means.—A practical outcome of the studies of the menthol series by E. Beckmann, communicated at the Cassel meeting of German naturalists and physicians, is the possibility of increasing the proportion of menthol in peppermint oil by chemical means. The peppermint oils contain besides menthol, which may be crystallized out by refrigeration, a second prominent constituent, menthone. By moderate oxidation, menthol, possessing the character of a secondary alcohol, is converted into menthone, but, reversibly,

Menthone is converted by reduction into menthol, and it became, therefore, quite possible to increase the quantity of menthol in peppermint oils at the expense of the menthone naturally contained in it. The principal object of the present investigation is the study of the isomeric modification of these two bodies, no less than eight isomeric menthols and four isomeric menthones being theoretically possible.—Pharm. Ztg., 48, No. 77 (Sept. 26, 1803), 780.

Peppermint Oil—Adulteration with a Sesquiterpene Oil.—Ernest J. Parry and C. T. Bennett have recently had the opportunity of examining many samples of peppermint oil which were not soluble in 70 per cent. alcohol. From some of these they have isolated a fraction of high boiling-point, which contained a body having a sp. gr. within the limits of peppermint oil, but with a strongly positive optical rotation and a high refractive index. From these physical characters and from its chemical reactions it is obvious that this body is a substance belonging to the sesquiterpene

series which is not normally present in pure peppermint oil. It strongly resembles dextro-cadinene, which has been detected in small quantities by Power and Kleber in normal peppermint oils, but the proportion in which it exists in these oils is sufficiently large to show that it has been added for sophisticating purposes. The general characters of these adulterated oils were in close agreement, falling within the following limits:

Sp. gr. at 15° C.....	0.909 to 0.912.
Optical rotation.....	—3° to + 3° 30 .
Refractive index	1.4760 to 1.4820.
Esters as menthyl acetate.....	5.8 per cent. (average).
Total menthol	34.0 per cent. (average).

When shaken with 70-per cent. alcohol, oily drops separated and sank. The oils were soluble in absolute alcohol, and in 90-per cent. alcohol with opalescence. From fractionations of the adulterated oil, and comparison with similar fractions obtained from genuine oil, the authors are of the opinion that the adulterant used for the samples of peppermint examined is the oil distilled from African copaiba, and it seems probable, from figures obtained during the past few months, that this adulteration has been going on for some time, though hitherto undetected. The chief oils containing sesquiterpenes are those of cedar, cade, juniper, gurjun and copaiba. Of these the only normal dextrorotatory oil is the oil of the African variety of copaiba, which Umney had shown to contain a dextrorotatory sesquiterpene from which no crystalline derivatives could be obtained. In order to confirm their opinion, samples of African copaiba were examined by the authors, and fractions separated having very similar characters to those of the adulterant described by them.—Chem. and Drugg., July 25, 1903, 154.

Referring to the above paper of Parry and Bennett, A. M. Todd makes some general observations concerning the adulterations of peppermint oils as revealed to him in an experience in the manufacture of peppermint oils, and particularly on the value of the specific gravity coupled with the optical rotation of a sample, which may have been so skillfully manipulated that none of the adulterants can be revealed by odor or the ordinary physical and chemical tests.—Chem. and Drugg., Aug. 22, 1903, 369.

Peppermint Oil—Adulteration with Cedar-Wood Oil.—Since publishing their paper on the adulteration of peppermint oil with oil of African copaiba (which see), Parry and Bennett have had samples for analysis which proved to be considerably adulterated with yet another comparatively cheap oil. Three samples of this oil had the following physical characters:

	A	B	C
Sp. gr. at 15°	0.9086	0.9080	0.9080
Optical rotation (100 Mm.)	— 24°	— 25°	— 24°
Refractive index at 20°	1.4670	1.4670	1.4673
Total menthol	48 %	48 %	49.1 %

The close agreement of these figures suggests that the oils emanated from a single source originally. The oils were insoluble in 70-per cent. alcohol, as much as 30 to 50 per cent. floating on the surface, according to the quantity of alcohol used. Two of the samples were fractionally distilled, and gave results which point clearly to the adulterant being of the nature of a sesquiterpene, and are in agreement with the presence of cedarwood oil, and, without stating this with certainty, the authors think the opinion that cedarwood oil was present, is justified.

In this connection the authors recapitulate their results obtained in the fractional distillation of pure and adulterated oils, the latter including the results obtained by Bennett in 1893 (see Proceedings 1893, 909) with peppermint oil adulterated with triacetin.—Chem. and Drugg., May 28, 1904, 854.

Otto of Rose—New Constituents.—Von Soden and Trepf describe the isolation of these new constituents of otto of rose. These are "nerol," "eugenol," and a "sesquiterpene alcohol." Nerol is the alcohol which was isolated from oils of neroli and petitgrain by the same chemists, and is isomeric with geraniol. The sesquiterpene alcohol, of the formula $C_{15}H_{26}O$, is very like the alcohol farnesol, isolated from cassie flowers, but has not so far been definitely identified with it. The sesquiterpene alcohol and eugenol are present to the extent of about 1 per cent. each.—Chem. and Drugg., June 25, 1904, 1001; from "Berichte," 1904, 1094.

Oil of Rose—Iodine Absorption a Factor in the Examination.—The iodine absorption of essential oils appears to have received very little attention from chemists. Interest has been revived in this direction, however, by a recent paper of Sangté-Ferrière and Cuniassé, and this has induced Frederick Hudson-Cox and Wm. H. Simmons to undertake some experiments with the object of determining the possible values of the method in the examination of oil of rose, in the course of which they obtained results which may prove useful for their purpose. In these experiments they used from 0.1 to 0.2 Gm. of the oil, added 10 Cc. of 90 per cent. alcohol and 25 Cc. of Hübl solution, and allowed the mixture to stand for three hours at the temperature of the laboratory, having satisfied themselves that variations in temperature from 4° to 27° C. made no appreciable difference in the results. The Hübl solution must, ^{very} be fresh as possible, and to this end it is best to keep the

chloride solutions separate, and to mix them the evening before they are required. The titration also must be carried out as quickly as possible, as the color rapidly comes back. Furthermore, it was found that chloroform could be substituted volume for volume for the alcohol employed in the test. The results, which as obtained with oil of rose of undoubted genuineness and with artificial otto and the common substitutes and adulterants, which are exhibited in several tables, show that genuine oil of rose may have an absorption of 187 to 194, while the artificial oil and the oils used as adulterants and substitutes, such as palma rosa and geranium oils, including also linalol and guaiacum oil, gave figures well over 200—the numbers ranging from 211 to 225 for geranium oils to from 221 to 279 for the artificial oil. On the other hand, while citronella oil gave 217, citronellol gave only 187 and citral as low a number as 175. These figures have been practically applied in the examination of a number of adulterated or suspected oils, as shown in one of the tables, and there seems little doubt that the method may prove available and useful. A point yet to be determined, however, is the time required for complete saturation, for, although the determinations were made after three hours' standing, it is certain that the reaction is not complete by then.—Pharm. Journ., June 25, 1904, 861.

Oil of Rosemary.—Constants of Commercial Samples.—Dr. Geo. R. Pancost and Willard Graham have examined in the past two years about fifteen samples of rosemary oil with the following results :

No.	Marked.	Specific gravity at 15° C.	Bornyl Acetate.	Optical Rotation.
1	Dalmatian	0.895	—	—
2	Dalmatian	0.897	—	+
3	Dalmatian	0.903	—	+
4	French	0.903	—	+
5	French extra	0.907	3.0	+
6	French	0.903	3.8	+
7	French flowers	0.888	8.3	+
8	French Eperlè	0.887	7.4	+
9	French	0.903	4.0	+
10	French Eperlè	0.910	—	+
11	French	0.884	3.4	+
12	French Eperlè	0.888	4.9	+
13	French	0.899	3.7	+
14	French Eperlè	0.890	3.1	—
15	Dalmatian	0.904	—	+

Solubility in 95 per cent. alcohol: Nos. 1 to 10 and Nos. 13 to 15, in all parts; No. 11, in 5 parts, no more; No. 12, in 3 parts, no more.

Solubility in 80 per cent. alcohol: Nos. 5 and 9, in $\frac{1}{2}$ part; Nos. 6, 10 and 13, in 1 part; No. 15, in 5 parts; Nos. 7, 8, 11, 12 and 14, not in 10 parts.

While there are several kinds of rosemary oils in commerce, the two kinds—Dalmatian and French—are the only kinds obtainable in large quantity at present.—*Amer. Journ. Pharm.*, 75, No. 10 (Oct., 1903), 453-454.

Sandarac Oil—Yield and Properties.—It is stated in Heinr. Haensel's report for July, 1903, that sandarac oil, which has heretofore been only superficially known, was obtained from the resin to the amount of 0.26 per cent. It is golden yellow, has an aromatic odor, and a camphoraceous bitter taste. Its sp. gr. at 15° C. is 0.8781; optical rotation at 20° C. in a 100 Mm. tube = + 67° 60'. It begins to boil at 167° C., and distils over undecomposed at 170° C. to the amount of 90 per cent. It is readily soluble in the usual solvents, forming clear solutions.—*Pharm. Ztg.*, 48, No. 57 (July 18, 1903), 574.

Santal-Wood Oil—Constants.—Ernest J. Parry and C. T. Bennett have made some very full investigations of authentic samples of santal-wood oil, and have obtained figures which have been found very constant among themselves, and will prove an acceptable addition to the recognized constants for this oil. The physical characters of the acetylated oil, which must be prepared in order to determine the santalol-value, are very constant, and appear to differ from those of the oil itself, only through the direct influence of the acetic acid introduced into combination, and would be materially affected by the presence of non-acetylizable constituents. The figures obtained from six samples are shown in the following table:

	Sp. Gr. at 15° C.	Rotation. (100 Mm.)	Refractive Index at 20° C.
1. English	0.986	—	1.4916
2. Dutch	0.9875	—14°	1.4915
3. German	0.9860	—14°	1.4895
4. English	0.9880	—14° 30'	1.4894
5. English	0.9870	—14° 10'	1.4899
6. English	0.9885	—13° 50'	1.4900

Four samples were distilled in fractions of 10 per cent. under reduced pressure, with results shown in separate tables. In these, the refractive index of these fractions of pure sandal-wood oil is shown to be about 1.5060, and should never fall below 1.5030. The limits in eight samples were 1.5040 to 1.5075. It is clear from an examination of the tables that no fraction should ever be obtained with a refractive index below 1.5000,

and the optical rotation (if the oil be distilled in ten fractions) should only vary within very narrow limits.—Chem. and Drugg., Jan. 30, 1904, 202.

"Mother of Thyme Oil"—*Source and Characters*.—It is stated in "Heinrich Haensel's Quarterly Report" (January, 1904) a "Mother of Thyme Oil" is introduced from France which is not, as is the genuine, a product of the leaves and flowers of *Thymus serpyllum*, but is said to be manufactured by distilling together a mixture of thyme, sage, spike and peppermint. The genuine oil, obtained by distilling the dried plant of *Thymus serpyllum*, L. (herba serpylli), with steam under high pressure, gave the following results: The yield was 0.196 per cent.; it exhibited a brownish color and a slightly acid reaction, and possessed a pleasant fragrance like the concentrated odor of the drug. The specific gravity was 0.9144 at 15° C., the optical rotation $a_D^{20} = -11^\circ$, the acid number 8.4, and the saponification number 42.7. The solubility of the oil was slight, only turbid solutions being obtained with absolute alcohol or 96-per cent. alcohol in the proportion of 1 to 50 alcohol.—Pharm. Journ., Feb. 20, 1904, 216.

Oil of Tuberose Blossoms—Composition.—In a previous report Schimmel & Co. had given the results of the examination of the oil (5 Gm.) obtained by steam distillation from 100 Gm. of tuberose blossom extract, by which they ascertained that this oil has a blue fluorescence, from which it appeared probable that, in accordance with observations made by them with oil of orange blossoms and other blossom oils, the methyl ester of anthranilic acid might be a constituent. They were also able by saponification of the oil to isolate benzoic acid, m. p. 122° C., which is present in the form of ester—possibly methyl ester. A. Hesse has now published a more detailed study on the same subject, which agrees in the main points with their statements. He also obtained from the tuberose extract an essential oil in which he detected methyl ester of anthranilic acid and ester of benzoic acid, and from 100 Gm. essential oil he was able to isolate not only the ester of anthranilic acid, but also, by oxidizing the oil with potassium permanganate solution, the stable ester of benzoic acid. The content of methyl ester of anthranilic acid was 1.13 per cent. It was separated by conversion into the difficulty soluble sulphate, according to the quantitative-estimation method worked out by Hesse and Zeitschel. The ester mixture not attacked by potassium permanganate distilled from 199° to above 240° C.; benzoic acid and benzyl alcohol could be obtained from it by saponification. A portion of the esters is accordingly in any case benzyl benzoate; whether a part of the benzoic acid is moreover combined with methyl alcohol, as we suspect, is doubted by Hesse, who considers the quantity of the acid in any case very small. Hesse was further able to isolate from the oil, by treatment with phthalic anhydride, an alcohol, which according to its boiling-point 206° to 214° C. and other behavior must consist chiefly

of benzyl alcohol. The latter is consequently also present in the free state in oil of tuberose blossoms.

Oil of tuberose blossoms is not only obtained by extraction, but also by the enfleurage method. Hesse has ascertained, by an experiment made on a large scale, that in the enfleurage of 1770 kilos tuberose blossoms, 1,374 Gm. essential oil pass over into the fat. This essential oil of tuberose blossoms had the following constants: $d_{15}^{20} = 1.012$; saponification number, 256.3; acid number, 32.7. Content of anthranilic acid ester 5.1 per cent. From the waste blossoms of the enfleurage process a further small quantity of essential oil could be obtained by extraction and steam distillation, so that it can be calculated that the enfleurage method yields in all 13.32 times more essential oil than the extraction of fresh blossoms. It follows that during the treatment with fat, the tuberose blossoms, like the jasmine blossoms, still develop quite considerable quantities of essential oil, and shows that in the blossom industry, since olden times, the enfleurage method in a wholly empirical manner has been discovered and employed, as the process which is undoubtedly the most rational one for the production of many blossom odors.—Schimmel's Rep., Oct.-Nov., 1903, 65; Berichte, 36 (1903), 1459.

Oil of Turpentine—Detection of Adulterants.—G. and R. Fritz, having proposed as sufficient for the detection of substitutes and adulterants of oil of turpentine—such as mineral oils, Russian oil of turpentine (rosin oil), etc.—the simple solubility test of the Germ. Pharm. IV, namely, clear solubility in 12 parts of 90 per cent. alcohol, Utz calls attention to the insufficiency of this test. This test is applicable only to the pure substitute or adulterant itself, but not when these are mixed with oil of turpentine. Thus, for instance, pure oil of turpentine may be mixed with the American adulterant known as "white spirit" to the amount of 50 per cent., forms a perfectly clear solution with 12 parts of 90 per cent. alcohol, and this is to a greater or less extent true in the case of mixtures with other adulterants. The detection of many of the adulterants, particularly of the various petroleum products, becomes possible only by the aid of polarization and the determination of the indices of refraction. The low specific gravity of a suspected sample also offers a means of recognizing adulteration, many of the adulterants having specific gravities ranging from 0.759 to 0.8066, whereas pure oil of turpentine has a sp. gr. of 0.855 to 0.865.—Apoth. Ztg., 18, No. 88 (Nov. 4, 1903), 775.

Turpentine Oil—Determination of Mineral Oil Present.—H. Herzfeld has constructed a small apparatus, which he describes in detail, by means of which the determination of mineral oil which may possibly be present in oil of turpentine, can conveniently be accomplished by Burton's method—treatment of the oil with one and a half times the volume of fuming nitric acid at reduced temperature. The use of this apparatus makes it possible to read off directly the quantity of mineral oils which are not

attacked by nitric acid. In a further paper, the author proposes the use of concentrated sulphuric acid instead of fuming nitric acid, proceeding as follows: He allows 10 Cc. of the oil to be examined to drop slowly and at slightly reduced temperature into 40 Cc. concentrated sulphuric acid. After 10 to 12 hours 8 to 9 per cent. of the turpentine oil used separates. Now the lower dark-brown layer is allowed to drain off, and the remaining oil is once more shaken with 3 to 4 Cc. fuming sulphuric acid. After standing for several hours, a further 1 to 2 per cent. of the oil separates, whilst if mineral oil is present the volume is proportionately larger.—Schimmel's Rep., April-May, 1904, 85; from Chem. Centralbl., 1903, i, 258, and 1904, i, 548.

Oil of Turpentine—Direct Distillation from Wood.—W. H. Horne contributes an interesting paper on the turpentine distillation direct from pine stumps, light wood, slabs, &c., in North Carolina, where plants for the destructive distillation of pine-wood have been in operation for a number of years, but appear to have met, until recently, with limited success. Recent experiments, however, have brought about improvements in the processes and apparatus employed. New plants are under construction, some of those already established are being enlarged, and wood distillation products are rapidly assuming an important place in the trade. Using both dead and live wood, and following in the main the process of destructive distillation known as the Bittinger process, the products heretofore produced are "oil of turpentine," "wood naphtha," "wood spirit," "spirittine," &c., and rosin oil, tar, creosote, and charcoal. This process and apparatus is described by the author in some detail, and may be said to be essentially the process of destructive distillation as ordinarily conducted—the output from a cord of wood being about 20 gallons of oil of turpentine, forty gallons of oil, and twenty-five gallons of tar. The oil of turpentine, after purification, is in no way distinguishable in its physical characters from that obtained from the oleo-resin, except that it is less aromatic than the oil distilled from "virgin gum," and this difference in odor appears to be the drawback in the efforts to market the product. Hence the continued efforts to perfect the methods of producing oil of turpentine direct from the wood, the latest and most important improvement being that made by the Weed Distilling Company, at their plant near Fayetteville, which is not a process of destructive distillation, the heat of a rosin-bath being used to distill the oil from the material.

In this process the wood sawed into billets is placed in an iron, box-shaped still about twenty feet square and five feet wide. The lids closing the apertures are secured in position and melted rosin at a temperature of 160° C. is pumped in and kept in circulation. Steam enters the still through perforations near the top. After the oil containing the turpentine comes over, the rosin is drawn off and the wood allowed to dry for several hours. It is then removed from the still and is without sign of char. In

another part of the plant this wood is worked to destructive distillation to obtain the creosote oils, charcoal, etc. The oil of turpentine is separated from the heavier oils by distillation. Four of these oils and a pitch are obtained, making six products derived from the distillate. It is claimed that from fifty gallons of this distillate, thirty-five gallons of spirit of turpentine is obtained, ten gallons of the four oils, and five gallons of pitch. A sample of this spirit, clear and colorless, was found to have a specific gravity of .868, was neutral in reaction, and left no appreciable residue on evaporation over a water-bath. The odor is mild and tar-like, and when compared with spirit obtained from "virgin gum," probably differs less than does that of the ordinary article of commerce. The chemists of the Agricultural Department at Washington have reported the oil as identical with pure spirit of turpentine in boiling-point, optical activity, etc. Aside from the question of odor, there seems no test prescribed in the U. S. P. which will distinguish between the rectified product obtained from wood and a sample of oil obtained from the oleoresin.—Proc. N. C. Pharm. Assoc., 1903, 35-37.

Pine Tar Oils—Source and Characters.—Edward Kremers calls attention to the so-called "pine-tar oils" which have in recent years been introduced as substitutes for oil of turpentine. These oils are obtained direct from roots, etc., rich in resin by a method of destructive distillation, and when subsequently rectified by distillation with milk of lime, they resemble the genuine turpentine oil, but as a rule have a slightly empyreumatic odor and differ somewhat in other respects. The author has had opportunity to examine two samples of such oil, evidently manufactured in Georgia—the one, marked "H" being nearly colorless; the other, marked "M" having but a slight yellowish tint; both had a terebinthinate, but slightly empyreumatic odor, and besides the odor reminded of lemon. The examination proved this oil to consist mainly of pinene. The lemon-like odor of the oil and the decline in the angle of rotation, indicate the presence of dipentene, the inversion product of pinene, due to the high temperature in the process of destructive distillation. It is apparently characteristic for these oils that when they are shaken with a 5 per cent. solution of caustic soda, a yellow or brown color is imparted to the aqueous layer after separation of the mixture. Pure turpentine oil, rectified from lime or soda, does not communicate this color, but crude turpentine oil produces a yellowish color.—Pharm. Rev., 22, No. 4 (April, 1905), 150-152.

Pine-Bud Oil—Properties.—According to H. Haensel's Report for July, 1903, pine-buds yielded 0.228 per cent. of a light-brown volatile oil, having a wonderful odor which, when distilled, resembles the aroma pervading the pine forests when the sun shines upon the young shoots and buds of these trees. This oil has the sp. gr. 0.9338, and is readily soluble in the usual

solvents, including 90 per cent. alcohol. Owing to its dark color its optical characters could only be determined in alcoholic solution. It was found to possess only slight rotating power, which was calculated to be $0^{\circ} 38'$, at 20° C. in a 100 Mm. tube.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 574.

Pine-Needle Oils—Cause of Scarcity, Constituents, etc.—Schimmel & Co. state that the fine Swiss distillate from the cones of *Abies pectinata*, also called

Oleum Templini, can at last again be obtained in abundant quantities, whilst the oil from the needles of *Abies pectinata*—the commercial pine-needle oil—like the genuine oil from *Pinus montana* could only be supplied under very difficult conditions and in insufficient quantities. The distillation carried on high in the Tyrolese and Styrian Alps is absolutely dependent upon the weather, and interruptions lasting from one to two months are in winter the order of the day. Furthermore, they observe, that the fact that certain aldehydes of the aliphatic series have an important bearing on the odor of some essential oils, has recently found further confirmation by their discovery of laurinic aldehyde in the oil of *Abies pectinata*—a body which, in the diluted state has a pleasant odor like pine needles, and whose occurrence in nature had up to the present not yet been observed. They isolated it by shaking the fractions of 3 kilos oil (800 to 900 Gm.), which boiled above 82° C. (5 Mm. pressure), for a considerable time, in an extracting apparatus, with bisulphite liquor; the bisulphite compound separated in a slimy condition, was then purified with alcohol and ether, and from this absolutely dry compound the aldehyde was liberated by means of soda-solution. It was fairly volatile with water vapor. The quantity amounted to only 9 Gm., i. e., 0.3 per cent. of the oil. The specific gravity of the principal fraction which passed over at 5 Mm. pressure between 108° and 120° C., was 0.8388. When the temperature was much reduced, the oil congealed into a white radiated crystalline mass, which at ordinary temperature again liquefied. This shows that the fraction did not consist of pure aldehyde, as the latter is solid at ordinary temperature. As a matter of fact, they succeeded by means of soda solution, in abstracting from the oil an acid of the melting-point of 43° C., which they recognized as laurinic acid, for a mixture of this acid and laurinic acid also melted at 43° C.—a proof of the identity of both bodies. The acid would, therefore, have been formed by oxidation of the aldehyde in the air.—Schimmel's Rep., April-May, 1904, 77–78.

Oils of Wintergreen and Sweet Birch—Satisfactory Method to Differentiate Between the Pure and Impure Oils.—In concluding a review of the clinical observations on the use of salicylic acid and sodium salicylate for the treatment of rheumatism (citing such authorities as Dr. Latham, of Cambridge; Dr. H. M. Lyman, of Chicago; Dr. Simon Baruch, of New

York; Dr. Charteris, Dr. MacLennan and Prof. Dunstan, from which it becomes apparent that the synthetic acid and salt are dangerous to animal life, while natural salicylic acid and its sodium salt are not), Dr. E. H. Cone calls attention to the fact that the oils of wintergreen and sweet birch are so frequently and ingeniously adulterated with synthetic methyl salicylate that a reliable method for distinguishing between the natural and synthetic oils, or their mixtures, becomes very important. While the specific gravity, boiling-point and optical rotation are useful for this purpose, the most accurate and convincing test is what is known as the "crystallization test," giving large, square-ended, laminated, opaque prisms of the natural acid, while the crystals of the synthetic acid are pointed and of different appearance generally. To make this test, two stock solutions are required, viz., *No. 1*, containing 80 Gm. NaOH in a liter of water, and *No. 2*, containing 320 Cc. HCl in a liter. The test is carried out as follows:

Place 6 Cc. of the oil in a 500-Cc. round-bottomed flask, and add 25 Cc. of solution *No. 1* and 25 Cc. of water. Boil until clear; then add about 350 Cc. of hot water and bring to a boil. Now add 25 Cc. of solution *No. 2*, boil for a few moments, and set aside in a moderately warm place so that crystals may form slowly. The careful operator, who must of course have familiarized himself perfectly with the crystallization of the natural and synthetic acids and the composition characteristic of the crystals, will have no difficulty to determine the purity of the sample or to determine the extent of adulteration down to as little as 5 per cent. of adulterant, but this is the limit. The test, furthermore, does not distinguish between the natural oils of wintergreen and sweet birch, for while these two oils may possess different physical and physiological characteristics, the acid made from them is identical.

Referring to the physical characteristics of these oils, the author observes that an expert can readily distinguish by the odor of the different oils, this being particularly marked between the synthetic oil and the oils of vegetable origin. Finally, in view of the important difference in these oils and in the light of our present knowledge of them, he considers it advisable to continue both of the natural oils and the synthetic methyl salicylate in the Pharmacopœia.—*Amer. Journ. Pharm.*, 75, No. 9 (Sept., 1903), 401-407.

ALCOHOLS AND DERIVATIVES.

Alcohol—Formation in Fermenting Saccharine Liquids.—Armand Gautier and G. Halphen, in their studies on the formation of alcohol in fermenting saccharine solutions, find that during the process of alcoholic fermentation the ammoniated nitrogen almost entirely disappears; the basic organic nitrogen increases or remains tolerably constant, whilst the albuminoid ammonia undergoes no sensible variation; the total nitrogen diminishes and the volatile acidity increases all through the process.

This acidity, which is always less than 0.1 Gm. per liter in grape juice, when it becomes greater than 0.15 Gm. per liter, taken in conjunction with the fact of the almost complete disappearance of the ammoniacal nitrogen, constitutes the best method of identifying the fermenting liquor. In grape juice a small proportion of cyclic and non-cyclic organic bases are found which increase in proportion as the fermentation proceeds. Traces of glycerin exist in grape juice, and during regular fermentation these increase in proportion to the alcohol formed.—Chem. News, July 10, 1903, 23; from Compt. rend., 86, No. 23, 1903.

Alcohol—Economical Production from Fæces not Probable.—The statement made some years ago by Dörning and Praetorius that fæcal matter had proved to be a possibly remunerative source of alcohol, the yield of which obtained by distillation being 7 to 8.74 per cent., calculated on the raw material, has led E. von Meyer and O. Mohr, independently, to investigate the subject. Neither of them, however, obtained a remunerative yield. The former obtained only 0.56 to 1.3 per cent. of alcohol, and the latter 3.8 Cc. from 1 kilo of fæcal matter. The commercial production of alcohol from this source would not, therefore, appear to be probable in the immediate future, as was at one time deemed possible.—Pharm. Journ., April 2, 1904, 466; from Chem. Centralblatt, Jan., 1904, 636.

Absolute Alcohol—Preparation by Fractional Distillation of Strong Alcohol in Admixture with Benzene.—Prof. Sidney Young has made the interesting observation that when a mixture of equal weights of, say, 94 per cent. alcohol and benzene (benzol, Rep.) is distilled, the components which can be separated by fractional distillation, if a very efficient still-head is used, are: (1) A mixture of alcohol, benzene and water, containing, theoretically, *all of the water*; (2) a mixture of alcohol and benzene, containing the *remainder of the benzene*; and (3) *pure alcohol*. This result is the more remarkable since the least volatile component of such a mixture—water—comes over in the first part of the distillate, while the most volatile component—alcohol—remains until the last. The author utilizes his observation for the practical production of absolute alcohol. The benzene and dilute alcohol are easily recovered from the first (ternary) fraction by treatment with water; and by distillation of the dilute alcohol, thus separated, strong alcohol may again be obtained. The second (binary) fraction, containing only benzene and alcohol, may be treated in the same way; or, it may be added to a further quantity of strong alcohol when it is to be dehydrated. There is thus practically no loss of alcohol or benzene. While water may, in the proposed process, be completely eliminated from the alcohol, there appears to be a minute trace of benzene left in the alcohol; but this, while too small to be detected by any chemical process, may be completely removed, if necessary, by distilling the dehydrated alcohol with normal hexane. The binary hexane-alcohol mixture, which comes over first, carries the benzene with it, and

no hexane is left in the residual alcohol.—Trans. Brit. Pharm. Conf., 1903, 432-434.

Alcohol—Convenient Table for Dilution.—Hans Helck has calculated the following table giving the percentage, by weight, of alcohol and of distilled water to make one liter, or one kilogram of alcohol of various dilutions. The figures given are based upon the tables of Windisch, but for practical reasons the calculations are carried to the second decimal only. Alcohol absolute is assumed to have the sp. gr. 0.79425; alcohol of 95 per cent., 0.8165 = 92.41 per cent. by weight.

TABLE FOR THE DILUTION OF ALCOHOL.

Percentage by Volume.	1 Liter contains		Specific Gravity at 60° F.	1 Kilogram contains		Percentage by Weight.
	Alcohol 95 per cent. Grams.	Distilled Water. Grams.		Alcohol 95 per cent. Grams.	Distilled Water. Grams.	
5.....	42.87	950.13	0.993	43.17	956.83	3.99
10.....	85.89	900.11	0.986	87.11	912.89	8.05
15.....	128.87	852.13	0.981	131.37	868.63	12.14
20.....	171.83	804.17	0.976	176.06	823.94	16.27
25.....	214.77	756.23	0.971	221.18	778.82	20.44
30.....	257.93	707.07	0.965	267.28	732.72	24.70
35.....	300.74	658.26	0.959	313.60	686.40	28.98
40.....	343.77	608.23	0.952	361.10	638.90	33.37
45.....	386.75	557.25	0.944	409.69	590.31	37.86
50.....	429.65	504.35	0.934	460.01	539.99	42.51
55.....	472.64	451.36	0.924	511.52	488.48	47.27
60.....	515.60	398.40	0.914	564.11	435.89	52.13
65.....	558.61	343.39	0.902	619.30	380.70	57.23
70.....	601.55	288.45	0.890	675.90	324.10	62.46
75.....	644.58	232.42	0.877	734.98	265.02	67.92
80.....	687.57	176.43	0.864	795.80	204.20	73.54
85.....	730.51	119.49	0.850	859.43	140.57	79.42
90.....	773.53	60.47	0.834	927.49	72.51	85.71

—Nat. Drugg., May, 1904, 138.

Commercial Alcohols—New Denaturizing Agent.—In 1895, Carimautrand had called attention to the insufficiency of the present methods of denaturizing commercial alcohols, and had shown that by special treatment it was possible to recover from alcohol denaturized by the official method (15 l. methylene, 0.5 l. heavy benzene (benzol) and 2 Gm. malachite green, to 100 l. of alcohol), at least 75 per cent. of an alcohol suitable for purposes of consumption. This method having been adhered to up to the present time, he has abstained from mentioning the denaturizer which he was prepared to suggest at the time he published his paper, but since a commission has now been appointed to prepare a complete revision of the law on spirits and commercial alcohols (in France), he considers the time opportune to state that the denaturizing

agent best adapted is methyl cyanide (acetonitrile), boiling at 82°C. , density at $15^{\circ} = 0.819$. This substance offers the advantage of not being separable by the fractional distillation of ethyl-alcohol, or by the method which he had used for the revivification of denaturized alcohol, a process also applicable to the elimination of all substances suitable for denaturizing, such as heavy oils from coal-tar, pyrogenous oils, aromatic essences, etc.—Chem. News, Jan. 24, 1903, 311; from Bull. Soc. Chim. (3), xxix., No. 14.

Brandy—Its Relation to the British Pharmacopœia and Chemical Valuation.—In a recent prosecution under the Sale of Food and Drugs Acts, in the North London Police Court, the magistrate in his judgment laid considerable stress on the fact that brandy is largely used as a medicine, and might therefore be expected to comply with the definition of brandy as set out in the British Pharmacopœia. He held that brandy should be derived exclusively from the grape, and gave it as his opinion that it is desirable that the Legislature should fix a standard defining what brandy is and what proportion of esters it should contain. As a minimum he suggested 80 parts per 100,000 of alcohol, and upon this his decision was based. He also expressed the opinion that the percentage of ethyl alcohol is, in a sense, unimportant, basing this opinion upon the medical evidence that the specific medicinal properties of brandy are due to bodies other than ethyl alcohol contained in it. It was further argued that a sample of brandy if low in esters and yet prepared from the grape only, might not be held to be pure brandy. Commenting on this judgment, John C. Umney and C. T. Bennett call attention to the fact that the minimum of esters, upon which the magistrate based his decision, 80 parts per 100,000 of alcohol, is in proportion of *absolute alcohol*, and not of the brandy itself or of proof spirit, upon which basis, in certain previous cases and published statistics, analytical results have been founded. It is thus obvious that water might be used to dilute brandy to the minimum strength of alcohol required by the Acts without affecting the proportion of esters to alcohol, whereas the addition of rectified spirit of wine prepared from any source, even wine itself, would be absolutely inadmissible. Furthermore, the authors mention that the inference of an ester standard from the monograph of the British Pharmacopœia, 1898, which describes brandy as "A spirituous liquid distilled from wine and matured by age, and containing not less than $36\frac{1}{2}$ per cent. by weight or $43\frac{1}{2}$ per cent. by volume of ethyl hydroxide," is a very dangerous one, although not without some precedent, and one that might lead to considerable difficulty in instances of more distinct pharmaceutical interest. It would be a very simple matter to make an addition of certain synthetic ethers to a product found to be deficient in this respect, and it is therefore clear that a simple determination of these bodies is not sufficient to pass or condemn a sample of brandy. For this purpose a more complete analysis is necessary, and the determination of the proportion of higher alco-

hols, aldehydes and acidity, in addition to that of esters, should be performed, and the processes now principally used in the municipal laboratories of Paris, which have been recently described in the "*Journ. de Pharm. et de Chim.*," are probably the best for this purpose.—These the authors briefly outline, as follows :

Free Acidity is determined by direct titration with decinormal alkali, and calculated as acetic acid in milligrams per liter.

Aldehydes are determined from a portion of the distillate (reduced to a strength of 50 per cent. absolute alcohol) by a colorimetric method based on the coloration developed in a rosaniline bisulphite solution in comparison with a standard solution of acetic aldehyde in 50 per cent. alcohol. The proportion is calculated as acetic aldehyde and corrected to x parts per 100,000 of absolute alcohol.

Furfural similarly by the coloration produced with aniline acetate (this, being an aldehyde, is included in the previous estimation of aldehydes).

Ethers (esters) by saponification of the distilled alcohol (after neutralization) by excess of decinormal alkali, titrating the excess, and calculating from the amount of alkali absorbed the proportion of esters as ethyl acetate per 100,000 of absolute alcohol.

Higher Alcohols are estimated in the distillate by first fixing the aldehydes by means of meta-phenylene-diamine hydrochloride, re-distilling, and comparing the color produced in a portion of the distillate by the addition of sulphuric acid, with a solution of iso-butyl alcohol in 50 per cent. alcohol, similarly treated.

These colorimetric methods are strictly comparative, and are not directly proportional to the coloration produced. A correction from curves determined experimentally is therefore necessary. The sum of the above figures expressed in milligrams per liter of absolute alcohol gives a number which is termed the "coefficient of impurities," and may be said to represent the proportion of flavoring-agents in the brandy. According to the report of the "*Lancet*" special analytical commission on brandy, this number reaches from 300 to 646 for special fine brandies, but may be as low as 250 for genuine brandies of an inferior type.

The authors record the results of ester-determinations made on the highest as well as low grade genuine brandies, as well as on brandies consisting of grain spirit and artificial flavors. These results show that the ratio of the amount of esters is by no means proportional to the cost. Moreover, there is no difficulty in producing a blended brandy, containing the required quantity of alcohol with the suggested proportion of esters, and yet it would be extremely difficult, as witnessed in the recent case, to prove that the brandy is not a genuine one, but has been produced by the addition of blended synthetic esters to a mixture of genuine brandy and so-called "silent" spirit from any source whatever. To a sample of brandy guaranteed genuine, but of low ester value, the authors added dif-

ferent proportions of blended synthetically-produced esters, and the relative proportions of esters have been determined; the products with the addition of small proportions of esters being indistinguishable, even by experts, by the features of taste and smell.—Chem. and Drugg., June 18, 1904, 968-970.

Beer.—Modification of Method for Determining Minute Quantities of *Arsenic*, which see under "Inorganic Chemistry."

Ether for Inhalation—Requirements and Test for Purity.—Willy Wobbe observes that while up to within twenty years ago ether was considered to be a very stable body, in the light of the numerous investigations and the observations gathered from the uses to which it has since been subjected, in the industries, in medicine, and in surgery, it is now known to be a very changeable compound, and one subject to the most diversified kinds of impurity. He reviews the literature on the subject in a comprehensive paper, and gives the details of exhaustive experiments undertaken to inquire into the relative value of the official requirements and tests of the different Pharmacopœias, which lead him to conclude that pure ether for inhalation should respond to the following requirements and tests: (1) Spec. grav., 0.718 to 0.720 at 15° C. (2) Boiling-point, not below 34° C. and not over 35° C. (3) Nessler's reagent should remain absolutely unaffected by it. (4) When 20 Cc. of the ether are shaken with 5 Cc. of alkaline silver nitrate solution in a glass-stoppered cylinder, no reaction of any kind should result. (5) When the same quantity of ether is shaken with 5 Cc. of freshly-prepared solution of potassium ferricyanide and ferric chloride and placed in the dark, the aqueous portion of the liquid should not assume a green or blue color. (6) If the same quantity of ether is shaken with 5 Cc. of a solution of potassium iodide and phenolphthalein, the latter should not assume a red color. (7) Twenty Cc. of the ether allowed to evaporate spontaneously in a glass dish should leave no perceptible odor or residue. (8) The same quantity of ether evaporated spontaneously after the addition of five drops of water, should leave a residue which neither reddens nor bleaches litmus paper. (9) The vapor of pure ether should have an alkaline reaction upon litmus paper.

Concerning the stability of ether, the author observes that when carefully prepared it will remain unchanged for a long time. A sample, 14 months old, preserved in a 150-Gm. vial, protected from the light, showed a sp. gr. of 0.719 at 15° C. and responded to all the above-mentioned tests. The addition of alcohol recommended by several authors, is not only unnecessary, but objectionable, because of its liability to obscure the test for aldehyde. Even the preservation of pure ether in small containers is not of paramount necessity, since it keeps quite well when gradually dispensed from large containers.—Apoth. Ztg., xviii., Nos. 53, 54, 56 (July 4, 8 and 15, 1903), 458, 465 and 487.

Aldehydes—A New Reaction.—E. Rimini has shown in a previous

paper that the aldehydes condense with nitrohydroxylamic acid, giving the hydroxylamic acids. This reaction allows of the isolation of the latter acid with difficulty, on account of the formation of a nitrite which, by the acidulation of the solution, changes the product through the oxidizing action of the oxides of nitrogen. The author finds that he can use benzene-sulphohydroxylamic acid, $C_6H_5SO_2NHOH$, which acts like the nitro-acid but gives benzene sulphuric acid, and that this does not interfere with the isolation of the hydroxylamic acid sought for. This latter is precipitated in the form of a cupric salt by the addition of acetate of copper to the aqueous acetic solution. The author has operated with formic, acetic, valeric, amino-valeric, acrylic, citral, glyoxal, glyceric, benzoic, piperonylic, anisic, salicylic and furfural aldehydes. Formic acid, however, gives the same reaction, as it contains the aldehydic group; the author also gives the analysis of the salts of copper obtained with these different substances. He proposes to examine the application of this reaction to the qualitative and quantitative detection of the aldehydes present in alcohol and in spirits.—Chem. News, March 11, 1904, 132; from Gazz. Chim. Ital., vol. xxxi., [2], p. 84.

Aldehydes—New General Reaction.—L. J. Simon and A. Conduché find that oxalacetic ether in the presence of ammonia forms solid condensation products with aldehydes, which are ketopyrrolidones. A molecular weight of oxalacetic ether, diluted in alcohol, is treated with a molecular weight of the aldehyde, benzaldehyde for example; a quantity of strong aqueous solution of ammonia equal in weight to the oxalacetic ether, is then added. The mixture becomes hot, and must be cooled with a stream of water. It is then set aside, and after a few hours an abundant crystalline precipitate is formed, which is the ammoniacal salt of the condensation product. This is collected, washed with alcohol, and dried. It may be liberated with facility from its combination with the base in the usual manner with dilute acid. The body thus obtained with benzaldehyde is a white solid, which is sparingly soluble in cold alcohol and cold water. It may be recrystallized from hot solutions. It decomposes, without melting, at about $185^{\circ}C$. It is soluble, without decomposition, in strong acids, and is reprecipitated on dilution with water. It is a feeble acid, and may be titrated by means of alkaline solutions, using phenolphthalein as indicator. A series of salts of this acid have been examined, and are described. It gives a phenyl-hydrazone, melting at $172-173^{\circ}C$., and an oxime which, when hydrated, melts at about $100^{\circ}C$., but when anhydrous at $150^{\circ}C$. This reaction also occurs with furfural and other aldehydes, which may be identified by the decomposition point of the condensation product and of its ammonium salts. Thus the compound of benzaldehyde decomposes at $185^{\circ}C$.; of meta-nitrobenzaldehyde at $173^{\circ}C$.; of salicaldehyde at $175^{\circ}C$.; of anisaldehyde at $160^{\circ}C$.; of vanillin at $180^{\circ}C$.; of piperonal at $155^{\circ}C$. Any primary base, such as methyl-

amine or aniline, may replace ammonia in the reaction, but secondary amines do not react.—Pharm. Journ., May, 1904, 744; from Compt. rend., 138, 977.

Aldehydes—New Method of Synthesis.—F. Bordroux has found that magnesium haloid salts are capable of forming compounds with radicals of the aromatic series, and that when these magnesium compounds are treated with ethyl orthoformate, they furnish the corresponding aldehyde, the process, in practice, being carried out as follows: To each molecular weight of the magnesium compound in ethereal solution 150 Gm. of pure dry toluene is added, and the mixture distilled to eliminate the uncombined ether. To the residue two-thirds to three-fourths of a molecular weight of ethyl orthoformate is added, drop by drop. An energetic reaction ensues, the liquid boils, and ether distils off. The mass is agitated, set aside for half an hour, and then treated with dilute hydrochloric acid; an oily liquid separates, and is decanted, washed, and dried. It contains the aldehyde ether, alone or contaminated with its ethyl acetal. To destroy the latter, the toluene is eliminated, and the mixture boiled with dilute (1:4) sulphuric acid. The aldehyde formed is then combined with sodium bisulphite, from which it is liberated in the usual manner. If the aldehyde has a relatively low boiling-point, the toluene mixture is shaken out at once with bisulphite solution, the toluene driven off, and the residue treated with dilute sulphuric acid, in a flask attached to a Lebel fractionating tube. The resulting distillate of ethyl alcohol and the aldehyde is thus easily separated. By this method 55 per cent of phenylacetic aldehyde was obtained from benzyl chloride; 70 per cent. of *a*-naphthoic aldehyde from *a* bromo-naphthalin; 60 per cent. of para-bromobenzoic aldehyde from para-dibromobenzene; 64 per cent. of para-chlorobenzoic aldehyde from para-chlorobenzene; 75 per cent. of butylic aldehyde from propyl bromide, and 66 per cent. of isovalerianic aldehyde from isobutyl bromide.—Pharm. Journ., June 4, 1904, 769; from Compt. rend., 138, 700.

Chloral Hydrate—Iodometric Method of Estimation.—E. Rupp recommends the following iodometric method for the estimation of chloral hydrate: To a mixture of 25 Cc. of $\frac{N}{10}$ iodine and 2.5 Cc. $\frac{N}{1}$ potassa solution in a glass-stoppered flask, 10 Cc. of chloral hydrate solution (1:100) are added, the mixture shaken and allowed to stand 5–10 minutes. It is then diluted with about 50 Cc. of water, 5 Cc. of hydrochloric acid added, and titrated with $\frac{N}{10}$ thiosulphate, in the usual manner. The limit of $\frac{N}{10}$ iodine consumed should be from 11.75–11.7 Cc., as indicated by 13.25–13.3 Cc. of $\frac{N}{10}$ thiosulphate consumed. 1 Cc. $\frac{N}{10}$ I = 0.008275 Gm. chloral hydrate.—Arch. d. Pharm., 241, No. 5 (July 31, 1903), 326–328.

Chloral Hydrate—Value as a Solvent.—Attention is drawn in "Zeit. des Oest. Apot. Ver." (1903, 758), to the extraordinary solvent powers of chloral hydrate. It has long been used for microscopical purposes to

render objects transparent, but its solvent power may also be utilized in many other ways. For example, in toxicological investigations for the detection of alkaloids a 60 to 80 per cent. aqueous solution of chloral dissolves all alkaloids and their salts, even the usually insoluble tannates. Resins, gum resins, and balsams are almost all soluble, and in the case of gum-resins a quantitative separation of the constituents may easily be effected, because by adding alcohol to the chloral solution the gum is precipitated, while the resin is thrown out by adding water. Fats, oils, and waxes show variations of solubility which may serve for their partial differentiation. Vegetable coloring matters, with the exception of indigo, are dissolved, as are blood-coloring matters, starch, gelatin, and proteids. —Pharm. Journ., Oct. 31, 1903, 614.

Chloroform—Nature of the Preservative Action of Alcohol.—Adrian has studied the nature of the action of alcohol in preserving chloroform, an effect long known but apparently not hitherto investigated. He finds that, as a matter of fact, alcohol does not obviate decomposition, but that it prevents the formation of objectionable decomposition products, forming harmless compounds instead. Thus, instead of free hydrochloric acid and carbon oxychloride being formed, trichloral and various esters of hydrochloric acid are formed in chloroform containing alcohol. As a rule, an addition of 10 Cc. of alcohol is made to the liter of chloroform to prevent the unfavorable decomposition.—Pharm. Journ., Aug. 29, 1903, 326; from Journ. Pharm. Chim. (6), 18, 5.

Solid Chloroform, Toluene and Ether—Melting-Points.—During an investigation on the properties of liquid gases, E. H. Archibald and D. McIntosh found it necessary to construct some low constant temperature baths, and in that connection have determined the melting-points of solid chloroform, toluene and ether by means of the hydrogen thermometer, correcting the observed results according to the methods worked out by Travers. The melting-points found were: Chloroform, -63.2°C. ; ether, -117.6°C. ; toluene, between -97°C. and -99°C. The above figures are somewhat different from those found by previous investigators.—Journ. Amer. Chem. Soc., 26 (1904), 373.

Chloral-Acetone chloroform is a new condensation product obtained by heating together 16.65 p. of chloral hydrate with 17.75 p. of liquid (or 18.65 p. crystallized) acetone chloroform for about half an hour at 75° – 80°C. The congealed product of the reaction is dissolved in twice its weight of hot benzol (or in ether, alcohol, or benzin), when, in cooling, it separates out in fine asbestos-like needles, having the composition $(\text{CH}_3)_2\text{CCl}_2\text{O} \cdot \text{CH}(\text{OH})\text{CCl}_3$. To obtain chloral-acetone chloroform absolutely pure, it requires several crystallizations. It melts at 65°C. , has a faint camphoraceous odor and taste, and is readily split into its components—chloral and acetone chloroform—by the action of sulphuric acid, even at the ordinary temperature. It has proven to be a prompt hypnotic with local anæ-

thetic properties, and to be free from the irritant effects of chloral.—*Pharm. Ztg.*, 49, No. 44 (June 1, 1904), 460.

Chloroform and Bromoform—Sensitive Color Reaction.—Dupouy finds that when 0.5 Cc. of a 5 per cent. alcoholic solution of thymol is treated with a drop of chloroform, a fragment of caustic potash, and boiled, that the mixture becomes yellow, then red. On adding 1 Cc. of sulphuric acid to this red solution and again heating, a very intense violet color is obtained. If a few drops of the violet liquid be dissolved in acetic acid, a solution is obtained which gives, on spectroscopical examination, a spectrum approaching that of oxyhemoglobin, but with the bands in the green nearer to the red. In the absence of chloroform, only a slight bluish tint is produced without any specific spectrum. The reaction is sufficiently delicate to serve for the detection of chloroform in toxicological analysis in the process of Vitali, the chloroform being distilled off in a current of hydrogen. Bromoform gives a similar reaction, but iodoform affords it with less facility.—*Pharm. Journ.*, Jan. 23, 1904, 77: from *Répertoire* [3], 15, 349.

Iodoform—Electrolytic Preparation from Acetone.—J. E. Teeple has obtained a good yield of iodoform by electrolyzing potassium iodide in the presence of acetone. The chief conditions were low anode current density and very high cathode current density, no excess of alkali, thorough stirring, and work at room temperature. It is essential that excess of alkali be neutralized as fast as it formed. The neutralizing agent may be carbon dioxide, hydrochloric acid, hydriodic acid, or iodine. The method has led to almost theoretical yields.—*Journ. Amer. Chem. Soc.*, 26 (1904), 170.

Iodoform—Determination of Purity.—Utz recommends the following volumetric method for determining the purity of iodoform, which is modified after a method for the estimation of iodoform in bandages and gauzes proposed by Lehmann in 1900, and more recently, under the use of special and superfluous reagents, by Luigi Bocci, in *Boll. Chim. farm.* (July, 1903): Dissolve 0.5 Gm. of the sample in 10 Cc. of spirit of ether, add 15 to 20 drops of fuming nitric acid and an excess of $\frac{N}{10}$ silver nitrate solution, and heat the mixture on the water-bath until the odor of nitrous acid has disappeared. Now dilute with water to 125–150 Cc., add 1 Cc. of saturated solution of ferric alum, and titrate the excess of silver nitrate with $\frac{N}{10}$ sulpho-cyanide of ammonium, 1 Cc. of $\frac{N}{10}$ silver nitrate = 0.0131 Gm. iodoform.—*Apoth. Ztg.*, 18, No. 98 (Dec. 9, 1903), 869.

Methyl Alcohol—Determination in Pharmacopœial Preparations.—Elsie S. Hooper, in search of a method suitable for the determination of methyl alcohol in pharmacopœial preparations, after reviewing those of Riche and Bardy, Mullikin and Scudder, Lucas, and the oxidation method with bichromate, as ordinarily conducted, calls attention to the oxidation method recently described by Thorpe and Holmes in the "Transactions of the

Chemical Society" (January, 1904), which is based upon the ultimate oxidation of the methyl alcohol to carbon dioxide, the ethyl alcohol being oxidized to acetic acid under the same conditions. The carbon dioxide is absorbed in soda-lime tubes, and from the gain in weight the amount of methyl alcohol present can be calculated. Thorpe and Holmes, however, found that when ethyl alcohol was present, a slight proportion of it was also oxidized to carbon dioxide; but this they found to be constant in quantity, so that a correction can be made, which consists in the deduction of 0.01 Gm. of the weight of CO_2 obtained for each Gm. of ethyl alcohol present. The details of the process, mostly taken from Thorpe and Holmes' paper, are as follows: The sample under examination is mixed with water in such a proportion that if 50 Cc. be taken they shall contain not more than 1 Gm. of methyl alcohol or more than 4 Gm. of the mixed alcohols. This solution is then placed in a flask fitted with a separating funnel and exit tubes. Twenty grammes of potassium bichromate are introduced into the oxidation flask, and then the solution to be analyzed, and 80 Cc. of dilute H_2SO_4 (1 in 4) are added; the flask is connected with a sulphuric acid drying apparatus and soda-lime tubes, and left for eighteen hours, so that the oxidation may proceed slowly. At the end of this time a further quantity of 10 Gm. of potassium bichromate and 50 Cc. of sulphuric acid, mixed with an equal volume of water, is introduced by means of a separating funnel. The contents of the oxidation flask are then gradually raised to the boiling-point, the carbon dioxide given off is absorbed in the soda-lime tubes; the boiling continued for five minutes, and then a current of air, free from CO_2 , drawn through the apparatus. The tubes are then weighed, and from the increase in weight the percentage of methyl alcohol present can be calculated.

This method the author proposes for the estimation of methyl alcohol (or methylated spirit) in various pharmacopoeial preparations, the process being illustrated in the following, as applied to

Aromatic Spirit of Ammonia.—25 Cc. of this spirit, made with, and containing about 60 per cent. of methylated spirit, was placed in a distilling flask, diluted with 80 Cc. of water, and made faintly acid with dilute sulphuric acid. The whole was then distilled, and the distillate collected in 25 Cc. of water. (About 100 Cc. of distillate was collected.) This was then placed in a separating funnel and shaken out with petroleum spirit (b. p. below 60°C .) and saturated salt solution. The aqueous layer was separated and again treated with petroleum spirit. (This second treatment is not always necessary.) The petroleum spirit was then washed with more of the saturated salt solution and the united aqueous solutions were then distilled into 25 Cc. of water, the distillate being finally made up to 100 Cc. The gravity of this diluted distillate was then taken by means of a specific gravity bottle, and the percentage of alcohol present in the diluted distillate determined; and this, multiplied by four, will give

the percentage of alcohol in the original sample. 25 Cc. of the distillate were then placed in an oxidation flask, and the operation carried out as already described.

The following results from various experiments may be of interest :

Preparation.	Methyl Alcohol Calc. from CO ₂ .	Corresponding Amount of Methylated Spirit.	Amount of Alcohol Calc. from Densities.
Tr. cardamomi co.....	5.504	62.5	62.0
Tr. quiniæ ammon.....	5.155	58.5	58.0
Sp. ammon. aromat.....	5.074	57.6	58.0
Lin. saponis.....	5.48	62.23	62.5
Methylated spirit	7.9	—	—

Preparations made with rectified spirits were also examined, and the amount of carbon dioxide obtained on oxidation was within the limit given in Thorpe and Holmes' paper, thus proving the method to be an excellent means of detecting adulteration with methylated spirit; it is, moreover, quick, easy and accurate, and has the advantage over all other methods in being quantitative as well as qualitative.—Pharm. Journ., Feb. 13, 1904, 189-190.

Methyl Alcohol—Determination in Presence of Ethyl Alcohol.—T. E. Thorpe and J. Holmes describe a method of estimating the amount of methyl alcohol in mixtures of methyl and ethyl alcohols based on the different modes of action of a mixture of potassium dichromate and sulphuric acid on the two alcohols. The method differs from that already described by Dupré, in 1876, in which the amount of acetic acid formed is taken as a measure of the amount of ethyl alcohol present, in that the amount of carbon dioxide evolved is weighed. The method is applicable to the case of the methylated spirit of commerce, and to the detection and determination of methylated spirit in tinctures and medicinal preparations suspected to contain it.—Pharm. Journ., Jan. 9, 1904, 28; from Proc. Chem. Soc., 19, 285.

Wood Alcohol—Toxic Effects.—The "Med. Journal" observes that some people are exceedingly susceptible to its toxic effects, even inhaling the vapor of wood alcohol while working with it in the trades being sufficient in some instances to cause alarming symptoms. It has a profound effect upon the intestinal canal, and upon the sensorium, as shown by the headache, vertigo, delirium, and dilation of the pupils. Its diagnosis is not difficult. The ophthalmoscope appearance is that of optic neuritis, with

exudations into the retina and subsequent atrophy. The caliber of the retinal vessels is much diminished, and the veins are tortuous, containing dark blood. In the early stages color blindness is often found. No treatment has been found of any service.—Midland Drugg., Aug., 1903, 1134.

Formaldehyde, 40 Per Cent.—Commercial Quality.—Willard Graham reports the results of an examination of ten samples of formaldehyde designated as 40 per cent. In his experience, the commercial 40 per cent. solution assays, as a rule, between 36 per cent. and 39 per cent., and this is borne out in the results of the present examination :

Sample.	Specific Gravity 15° C.	Per Cent. by Volume.
No. 1.....	1.07	36.5
No. 2.....	1.07	35.7
No. 3.....	1.07	36.8
No. 4.....	1.09	39.6
No. 5.....	1.10	38.8
No. 6.....	1.09	38.5
No. 7.....	1.07	36.0
No. 8.....	1.07	39.2
No. 9.....	1.07	38.6
No. 10.....	1.08	39.5

Sample No. 4 contained a large amount of para-formaldehyde.—Proc. Pa. Pharm. Assoc., 1903, 224.

Formaldehyde and Paraformaldehyde—Simple Quantitative Method of Determination.—Dr. Clemens Kleber recommends the following simple method for the quantitative determination of formaldehyde : To commercial concentrated sodium bisulphite solution, which generally contains a considerable quantity of free sulphurous acid, a solution of pure caustic soda, preferably made from the article purified with alcohol, is added, until the odor of sulphurous acid has completely disappeared. No special care is required in this operation, as a slight excess of caustic soda over the quantity necessary for deodorizing is immaterial. Then this solution is diluted with water until 30 Cc. of it exactly neutralizes 50 Cc. of normal caustic soda, using phenolphthalein as an indicator. Towards this solution formaldehyde behaves like an alkali, and can be titrated accordingly.—Pharm. Review, 22, No. 3 (March, 1904), 94.

Formaldehyde—Iodometric Estimation.—Referring to L. Reuter's review of several methods for the estimation of formaldehyde in which the iodometric method of Romijn is recommended (see Proceedings, 1903, 922) as the most accurate, rapid and convenient, Frank O. Taylor observes that the method is quite as satisfactory as claimed by Mr. Reuter, but the quantities of formaldehyde and reagents used are unnecessarily large and cumbersome, and the determination of the specific gravity and the calculation may be avoided by the following modification of the method : From a weighing bottle, consisting of a small Erlenmeyer flask

fitted with a perforated rubber stopper through which passes a dropper, and containing about 25 or 30 Cc. of the formaldehyde solution, weigh out accurately about 10 Gm. of the solution into a stoppered 500 Cc. flask and fill this to the mark with distilled water. For titration remove 5 Cc. of this solution, corresponding to 0.01 Gm. of the weighed quantity of formaldehyde, and put into a 200 Cc. Erlenmeyer flask. Into another flask put 5 Cc. of water for a blank titration. To both now add 20 Cc. of normal NaOH and then 20 Cc. of an approximately $\frac{N}{8}$ iodine solution, whose exact strength need not be known, and let stand for five or ten minutes for the entire completion of the reaction. Now add 25 Cc. of normal H_2SO_4 and titrate the liberated excess of iodine with $\frac{N}{10} Na_2S_2O_4$. The difference between the cubic centimeter of thiosulphate used on the assay and the cubic centimeter of the blank is the number of cubic centimeters of $\frac{N}{10}$ consumed by the formaldehyde. Each cubic centimeter of $\frac{N}{10}$ iodine so used equals 0.0015 Gm. of CH_2O . By some inadvertence it is stated in Mr. Reuter's article, above referred to, that each cubic centimeter of $\frac{N}{8}$ iodine equals 0.0015 Gm. of CH_2O .—Bull. Pharm., Aug., 1903, 323, 324.

Methyl-Arsenates of Mercury—Preparation and Properties.—Saint Sernin communicates methods for the production of mercurous and mercuric methyl arsenates, and briefly describes their composition and properties. To obtain

Mercurous Methylarsenate, mercurous oxide is treated directly with methylarsenic acid. A prismatic crystalline precipitate soon separates from the liquid, which is separated by decantation, washed with a little water and dried. The structural formula of the resulting mercurous compound is $CH_3AsO-OO-Hg$. The salt is not affected by light even when heated to $300^\circ C$. It is soluble to the amount of 0.44 Gm. in 1 liter of water at $15^\circ C$. and 1 Gm. at $100^\circ C$., but its solubility is increased by the addition of sodium chloride. To obtain

Mercuric Methylarsenate, $CH_3AsO-OO-Hg$, mercuric nitrate is treated with sodium methylarsenate. The crystals formed may be washed with water without decomposition, and they remain unchanged when exposed to light or a temperature of $200^\circ C$., but at a higher temperature they acquire a yellow color. Pharm. Centralh., 45, No. 16 (April 21, 1904), 298; from Bull. Soc. de Pharm. de Bordeaux, Aug., 1903, through Rép. de Pharm., 1903, 450.

Creosote—Rapid Differentiation from Phenol.—Michonneau describes the following simple method for rapidly differentiating creosote and phenol: put 15 Cc. creosote and 15 Cc. ordinary glycerin into a tube divided into 1-10 Cc., agitate together until the creosote is dissolved, and then fill with water up to the 50 Cc. mark. Now shake once more, thoroughly, and set aside for the emulsion to again separate. Read off

the amount of separated creosote and pour off the supernatant mixture of creosote and glycerin and dilute the remainder with water, bringing it up again to the 50 Cc. mark, agitate and again read off the amount of separated creosote. Pour off the supernatant fluid, again fill with water up to 50 Cc., agitate and read the amount of separated creosote. Add the three readings. Fifteen Cc. of pure creosote yield 14 Cc. after thrice washing. If phenol be present to the amount of 10 per cent., the reading will be 13.5 Cc.; 20 per cent. of phenol yields 13 Cc.; 40 per cent. phenol yields 12 Cc., thus giving a scale for the ready computation of phenol adulteration.—*Nat. Drugg.*, Jan'y, 1904, 11; from "*Nouv. Remèdes.*"

Mercuric Phenolate—Preparation, Characters, etc.—E. Hirschsohn has investigated the nature of the difference observed in mercuric phenolates of commerce, which vary in color from greyish-white to reddish-brown. He finds that the pure salt forms colorless crystals, and that the different colored commercial products result from the partial conversion of the true mercuric salt into mercurous salt by reduction during the process of preparation. In order to obtain a colorless mercuric phenolate of definite and satisfactory composition, he recommends the following process: A solution of 20 Gm. of carbolic acid and 8 Gm. of sodium hydroxide in 40 Cc. of distilled water is added to a boiling solution of 27 Gm. of mercuric chloride in 600 Cc. of water, and the mixture is allowed to cool. The mercuric phenolate is washed by decantation until the washings no longer give evidence of chloride, and is then dried at the ordinary temperature or by gentle heat. The product is absolutely colorless, forms a clear and colorless solution on boiling 0.5 Gm. with 5 Cc. of 10 per cent. soda solution, and is completely soluble in hydrochloric acid of sp. gr. 1.12. It swells at first when covered with ammonia water (sp. gr. 0.960), but soon forms a dense solution. Estimated by the method of Fresenius, the salt was found to contain 66.35 to 66.86 per cent. of mercury.—*Pharm. Centralh.*, 44, No. 53 (Dec. 31, 1903), 921.

New Tri-Iodophenol—Synthetic Production.—P. Brennan has succeeded in synthesizing the tri-iodophenol, $\text{OH.C}_6\text{H}_2\text{I}_3$, 1354. The diazo-sulphate of orthonitraniline di-iodide is converted into a tri-iodonitrobenzene, $\text{C}_6\text{H}_2\text{I}_3$, by means of potassium iodide. This derivative gives, on reduction, tri-iodoaniline, $\text{C}_6\text{H}_2\text{I}_3$. When this base is diazotized, and the diazo compound is heated in the presence of water, the tri-iodophenol is formed. When purified by recrystallization from boiling dilute acetic acid it forms colorless needles; from a mixture of benzol and petroleum ether it separates in prismatic needles, melting at 114°C . Its ethyl ester forms fine, silky needles, melting at 120°C ., having the composition $\text{C}_8\text{H}_5\text{O.C}_6\text{H}_2\text{I}_3$.—*Pharm. Journ.*, Feb. 27, 1904, 247; from *Compt. rend.*, 137, 1065.

Triphenyloxyarsonium Chloride—Preparation and Pharmacological

Value.—By passing chlorine into a chloroform solution of *triphenylarsin*, and precipitation with ether, a crystalline compound containing 20.9 per cent. As is obtained, which has the formula of a *triphenyloxyarsonium chloride*, viz. $(C_6H_5)_3As.OH.Cl$. It is claimed that this compound contains the arsenic in very firm combination, and is regarded as a comparatively non-toxic arsenic compound of pharmacological value.—*Pharm. Ztg.*, 48, No. 85 (Oct. 24, 1903), 865.

Glycerin—Detection of Iron.—E. Dowzard recommends the following test for detecting the presence of iron in glycerin, which he has used for a number of years with perfect satisfaction: Pour about 75 Cc. of the glycerin into a Nessler glass; to this add 2 Cc. of a 5-per cent. solution of tannic acid, and make the mixture up to 100 Cc. with water. After mixing thoroughly, the liquid is allowed to stand for fifteen to twenty minutes. The color is then noted by placing the Nessler glass on a white tile in a good light, and looking through the column of liquid from above. At the most there should only be a slight darkening in color. The tannic-acid solution should contain 20 per cent. of alcohol to prevent decomposition. Glycerin which will stand this test is now easily obtainable. Some samples when examined by the method turn to an almost inky blackness, and a great number give a very distinct darkening.—*Chem. and Drugg.*, Dec. 26, 1903, 1061.

Glycerophosphates—Uniformity in Nomenclature and Strengths of Various Preparations.—In view of the attention that has been attached in recent years to the salts of glycerophosphoric acid and their preparations, and with the object of preventing the danger that the preparations of these salts may get into the same confusion, as to strength and nomenclature, as the preparations of the hypophosphites, Melvin W. Bamford suggests the adoption either in the U. S. Pharmacopœia or the National Formulary of a series of Elixirs, representing various combinations of these salts under uniform titles and compositions. These are given under "Elixirs," which see under "Pharmacy."

Calcium Glycerophosphate—Preparation and Estimation.—Introducing the subject of preparing and estimating the quality of calcium glycerophosphate, H. B. Eichelberger observes that although glycerophosphoric acid, $C_6H_5PO_6$, was first prepared and described by Pelouse in 1840, it was not until 1894 that the salts of this acid were, by Dr. Albert Robbin of Paris, introduced in medicine. The author finds the following method, proposed some years ago by Porter and Premier, to be satisfactory and practical for the preparation of the calcium salt: Mix 3 Kgm. of 60 per cent. phosphoric acid and 3 Kgm. of glycerin (sp. gr. 1.24), and keep the mixture at a temperature of 100° – 110° Cc. for six days, agitating three or or four times daily. On the second day the mixture commences to color and emits fumes, on the fifth it will have turned brown and ceases to fume,

and on the seventh day, being allowed to cool, forms a viscous, transparent mass. It is now mixed with 500 Gm. of calcium carbonate suspended in 2 Kgm. of water, allowed to settle two or three hours, and then more calcium carbonate is added in the same way until the acid is saturated, which generally takes about two days. The exactly neutral mixture is now filtered, the filtrate precipitated by 90 per cent. alcohol, the precipitate washed (with alcohol ? Rep.), drained, redissolved in cold water, again filtered, and the filtrate evaporated at a low temperature. The calcium glycerophosphate so obtained is a white crystalline powder, soluble in 15 parts of cold water, almost insoluble in boiling water, insoluble in alcohol, and if the conversion into glycerophosphoric acid has been complete, should yield by the usual method of calcium estimation—precipitation as the oxalate and weighing as oxide, as given by Fresenius—21.6 to 22.5 per cent. of calcium oxide, the theoretical quantity being 22.6 per cent. If, on the other hand, the conversion of the phosphoric acid into glycerophosphoric acid is incomplete, the free phosphoric acid will require a larger percentage of calcium for neutralization, in proportion to its presence. Thus, in an examination of a sample bearing an English brand, which had slightly acid reaction, 33.05 per cent. of calcium oxide was determined by the method mentioned.—*Amer. Journ. Pharm.*, 76, No. 5 (May, 1904), 212-214.

FIXED OILS.

Fats, Waxes, &c.—Simple Method of Determining Melting Points.—Kraemer and Sarthou recommend the following simple method for determining the melting-point of fats, waxes, resins, etc.: Twenty Gm. of the substance are melted in a small dish of a size and shape so chosen that the liquid will have a depth of 10 millimeters. An open glass tube 7 or 8 millimeters in diameter is then dipped into the melted liquid, the upper end closed with the finger, and the enclosed liquid withdrawn and allowed to solidify. Five Gm. of mercury are poured into the open end of the tube upon the solidified cylinder of fat or wax. This is then suspended in a beaker of cold water containing a thermometer so placed that the bulb is beside the cylinder of solidified material. The beaker is placed in a larger one also containing water and serving as a water-bath, and the whole cautiously heated. The temperature taken at the moment when the column of mercury forces its way through the softening cylinder is the melting-point required.—*Pharm. Era*, Oct. 1, 1903, 344; from "*Nouv. Remèdes*."

Fats—Hydrolysis by the Ferment of Castor Oil Seeds.—The statement of Green and Sigmund that the presence of free acid has a retarding effect on the formation of fatty acids by the specific ferment of castor-oil seeds, is controverted by the experiments of W. Counstein, E. Hoyer and H. Wartenberg. They find, on the contrary, that rapid conversion of glycer-

ides into fatty acids does not take place until the amount of acid has reached a certain point, when it suddenly becomes greatly increased. Thus, an emulsion of castor-oil seeds, protected by means of 1 per cent. of chloral hydrate, showed at first 1 per cent. of free ricinoleic acid; in two days, 3 per cent.; in four days, 52 per cent.; in six days, 57 per cent.; and in eight days, 59 per cent. This experiment was conducted at 16° C. When a similar experiment was performed at 35° C., the amount of free ricinoleic acid was, at first, 3 per cent.; in one day, 5 per cent.; in two days, 52 per cent.; in three days, 85 per cent.; and in four days, 95 per cent. of the total glycerides. It was further found that the addition of acetic acid, acid sulphate of sodium, and free sulphuric acid in all cases greatly accelerated the formation of free fatty acid, not only with castor oil, but with other animal and vegetable fats. Castor-oil cake, freed from oil, was found to be the best source of the active ferment. Some fats, such as that of the coco-nut, and particularly butter, are not so readily hydrolized by the ferment as others, such as cotton-seed oil. With synthetic esters of the fatty acids as with the natural glycerides, the sudden increase of free fatty acids only occurs when the amount of free acid reaches a certain point. The presence of a certain amount of water is absolutely necessary for the success of the reaction, and the oil operated on should be well emulsified. When solid acid fats are treated, the liberated fatty acids, being crystalline, may be at once separated by expression. When the glycerides of stearic and oleic acids are employed, the "stearine" is obtained perfectly white without requiring any subsequent purification, and the "olein" is much lighter in color and clearer than that resulting from chemical reactions. Any esters which have escaped hydrolysis will be fluid, and will therefore be removed by filtration and pressure, leaving the "stearine" pure enough for immediate commercial use.

In this connection it is important to note that, although the ferment of *Ricinus* is more active in the presence of free acid, C. K. Braun and E. Behrendt find that such is not the case with abrin, the ferment of *Abrus precatorius*, which gives the best results in a neutral medium, and further that emulsin and arbutin are without any fermentative action on fats.—Pharm. Journ., Nov. 14, 1903, 701; from *Berichte*, 35, 3,988, and 36, 1,142.

Fatty Acids—Esterification Under the Influence of the Pancreatic Ferment.—H. Pottevin has previously shown that in the presence of the pancreatic ferment,

Oleic Acid may be combined with glycerin to form glyceryl mon-oleate. He now finds that by maintaining a mixture of mono-olein and oleic acid at 36° C., in the presence of pancreatic tissue, triolein is ultimately formed, indistinguishable from natural triolein. The decrease of the free oleic acid may be observed from day to day; when this quantity becomes constant, the reaction is complete. By substituting various alcohols for

mono-olein in the above experiment, the esters corresponding to triolein were obtained. Iso-amyl alcohol was found to give the best yield, 80.1 per cent. of the acid employed combined as ester in twenty-three days; in that time methyl alcohol united with 69.6 per cent. of the acid, and ethyl alcohol with 21.4 per cent.

Stearic Acid esterifies well under like conditions. Iso-amyl stearate was obtained as a neutral white substance, solid at ordinary temperatures, melting at 21°C . The lower acids, acetic, butyric and propionic, are also esterified, provided that their proportion in the alcohol does not exceed a certain limit; in the case of acetic acid, diastasic action ceases if more than 8 parts of acid are present in 100 parts of alcohol. Lactic and benzoic acids do not form esters with the pancreatic ferment, the presence of the former retards the reaction with other acids. The action depends on contact with the pancreatic tissue, and is not due to a soluble ferment; for, if a portion of the acid-alcohol mixture be removed during the process, no further esterification takes place in the portion containing no pancreatic tissue, while the acid continues to diminish in the original portion. The esters obtained are saponified when again brought into contact with pancreatic tissue in the presence of water.—Pharm. Journ., April 9, 1904, 492; from *Compt. rend.*, 138, 378.

Margarine—Adulteration with Coconut Oil.—E. W. T. Jones calls attention to the occurrence on the market of margarine evidently containing coconut oil, the fat of which has a high specific gravity, a low Valenta degree, and a refraction with the butyro-refractometer corresponding with that of genuine butter fat; hence this instrument is rendered quite useless for their detection. The following figures have been obtained by the author in two samples that have just come under his notice:

Specific gravity at $100^{\circ}/100^{\circ}\text{F}$	911.3	909.7
Reichert (5 Grms.).....	4.3	4.5
Valenta turbidity test.....	74°C .	79°C .
Butyro-refractometer at 30°C	50°	47.5°

—Chem. News, Dec. 24, 1903, 317.

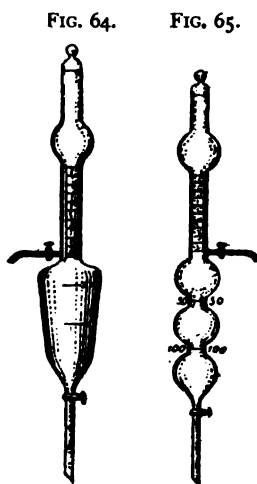
Fixed Oils—Analytical Value of the "Viscosity Figure" of their Soap Solutions.—H. C. Sherman and Herbert Abraham have determined the viscosities of solutions of the potassium soap of several vegetable and a few animal oils. They find that olive and almond oils yield soap solutions of considerably greater viscosity than those obtained from the other more common fatty oils. The "viscosity figure" is apparently higher in the better than in the poorer grades of olive oil. The lowering of the viscosity figure by admixture of other oils furnishes an additional method for the detection of adulteration in olive and almond oils, and will be specially useful for the detection of lard oil. The characteristic high viscosity figure of olive or of almond oil may be largely lost on sufficiently

long exposure of the oil to air at ordinary temperatures. The explanation of the high figures shown by olive and almond oils is thought by the authors to lie in the quantitative relations of the fatty acids present rather than in the presence of any peculiar constituent.—*Pharm. Journ.*, Oct. 17, 1903, 548; from *Journ. Amer. Chem. Soc.*, 25, 977.

Fixed Oils—Determination of the Heat Index by Means of the Thermoleometer.—Tortelli recommends the determination of the "heat index" of fixed oil for the recognition of purity or adulterants, this depending on the variation in the increase in temperature when different fixed oils are mixed in certain proportions with concentrated sulphuric acid. While this method has been heretofore suggested by others, it has not found practical application because of the difficulty to rapidly and accurately determine the heat number. The author has, however, succeeded in devising an apparatus which he calls the thermoleometer, which seems to facilitate these determinations with accuracy and dispatch. It consists of a double-walled beaker, the intermediate space being a vacuum, so that the loss of heat is reduced to a minimum, and a very delicate thermometer provided with blades, similar with those on a propellor wheel, to enable the rapid admixture of the oil and acid, by simply twirling it in the mixture. In use, 20 Cc. of the oil are placed in the beaker, the thermometer is inserted and is twirled rapidly for about a minute, and the temperature is then noted; 5 Cc. of concentrated sulphuric acid is then dropped into the oil, with continuous stirring, an operation which should require about 30 seconds, and the stirring is continued until the highest increase of temperature is reached and retained for about 2 minutes, whereupon the temperature will slowly sink under continued stirring. The difference between the highest temperature thus obtained and that ascertained immediately before the addition of the acid then gives the "heat index" or "heat number" of the sample. In this way the author has determined the heat number of different oils obtained with sulphuric acid, sp. gr. 1.8413, as follows: Olive oil, 44.0; arachis oil, 50.6; cotton-seed oil, 78.0; colza oil, 61.2; hemp-seed oil, 89.0; hazelnut oil, 48.0; linseed oil, 124.4; almond oil, 50.7; poppy oil, 88.4; peach-kernel oil, 60.5; ricinus oil, 67.8; rape-seed oil, 60.8; sesame oil, 73.3. Obviously these figures are only comparable when the sp. gr. of the acid used is the same. With a change in the specific gravity of the acid there is correspondingly also a change in the rise of temperature.—*Pharm. Ztg.*, 49, No. 43 (May 28, 1904), 448.

Fat and Soap Analyses—Combination Separator and Burette.—Ed. Donath has devised the separator shown in two forms by Figs. 64 and 65, which, being combined with a burette, offers great convenience in the analyses of fats and soaps. The body of the separator proper has a capacity of 150 Cc., and is provided, in Fig. 64, with marks indicating divisions of 50 Cc., whilst in Fig. 65 the same division is effected by three bulbs, each of 50 Cc. capacity, the mark being on the constrictions be-

tween the several bulbs, and facilitating the more accurate measurement on withdrawing the aqueous content of the separator from beneath. The burette, which is identical in both forms, is graduated in cubic centimeters,



Separators.

from 0 to 50, and at a point just above the 50 mark is provided with a small elongated faucet for the withdrawal of the ethereal solution in the desired fractional quantities.—Pharm. Zig., 48, No. 62 (Aug. 5, 1903), 627.

Rare Fixed Oils—Characters.—J. Lewkowsch has examined and determined the characters and constants of several fixed oils that are rarely found in the market, as follows:

Oil of Melia Azedarach, known in India as "neem oil," "mayosa oil," "veepa oil," and "veppam fat," has the sp. gr. at 40°/40° C., 0.9023; at 15°/15° C., 0.9142; saponification value, 156.9; iodine value, 69.6; Reichert-Meissl value, 1.1; refraction by butyro-refractometer, 52° C.; titer test of fatty acids, 42.0° C. The oil is solid at ordinary temperatures.

Oil of Pongamia Glabra, extracted from the seeds of the plant, and compared with the native pressed product, known in India as "kanoo-gamanoo," "kanoogoo," "kanuga-karra," "kanugachettu," "korung oil," "kagoo oil," and (in Mysore) as "honge oil," gave the following figures: The ether-extracted oil had the sp. gr. at 40°/40° C., 0.9352; saponification value, 178; iodine value, 94; unsaponifiable matter, 9.22 per cent. Melting-point of saponifiable fatty acids, 44.4° C. Refraction by butyro-refractometer, 78.0°. Free fatty acids (as oleic acid), 3.05 per cent. The native pressed oil had the sp. gr. 40°/40° C., 0.9240; 15°/15° C., 0.9369; saponification value, 183.1; iodine value, 89.4; Reichert-Meissl value, 1.1; refraction by butyro-refractometer, 70°; free fatty acids as oleic acid, 0.5 per cent. As the oil is obtainable in large quantities it might find technical application in soap and candle manufacture. In India it is used as an illuminant and for medicinal purposes.

"Ben Oil."—The characters usually given for "ben oil" do not accord with those given by an authentic specimen of the true oil, furnished by the Director of the Imperial Institute, derived from *Moringa pterygosperma*, from Jamaica. The chief interest lies in its very low iodine value; this explains why the oil is specially valuable for lubricating watch springs and other delicate machinery. Sp. gr. 15°/15° C., 0.9126; iodine value, 72.2; iodine value of fatty acids, 97.53; refraction by butyro-refractometer, 50°.—Pharm. Journ., April 9, 1904, 492; from Analyst, 27 (1904), 342-343.

Rare Fixed Oils—Constants.—Dr. George R. Pancoast and Willard

Graham have had opportunity to examine a number of rare fixed oils, of which they communicate the following data :

	Specific gravity 15° C.	Acid Number.	Saponification Number.
Oil of walnuts.....	0.925	3.5	197.0
Oil of hazelnuts.....	0.917	3.5	192.5
Oil of hickory nuts.....	0.921	2.3	195.6
Oil of lobelia.....	0.925		
Oil of strophanthus	0.927		
Oil of pumpkin.....	0.920	3.5	195.5
Oil of larkspur	0.884		
Oil of nux vomica.....	0.935		
Oil of ergot.....	0.918		

Of these, the oils of walnuts, hazelnuts, hickory nuts, pumpkin seed, and larkspur, were obtained by expression; the oils of nux vomica, ergot, and strophanthus, as by-products in the manufacture of pharmaceuticals; the oil of lobelia by extraction with a volatile solvent direct.—Amer. Journ. Pharm., 76, No. 2 (Feb., 1904), 70-71.

Fixed Oils—Constants of Some New or Little Known Kinds.—J. A. Wijs describes the physical characters and gives the constants of a number of fixed oils, which are either new or little known, as follows :

Echinops Oil, obtained from the seeds of *Echinops ritro*, is soluble in petroleum-ether and the other organic solvents, and in 15 p. of alcohol; has the sp. gr., at 20° C., of 0.9275; acid number, 4.38 to 7.31; saponification number, 189.2 to 190; 138.1 to 141.2; acetyl saponification number, 211.2; acetyl number, 26.5.

Perilla Oil, obtained from the seeds of *Perilla scymoides*, has the odor and taste of linseed oil; the sp. gr., at 20° C., of 0.9306; acid number, 0.48; saponification number, 189.6; iodine number, 206.1.

Watermelon Oil, obtained from the seeds of *Cucumis citrullus* by extraction with benzol, has a yellow color, a bland taste, and is nearly odorless; a sp. gr. at 20° C. of 0.9160; acid number, 1.20; saponification number, 189.7; iodine number, 118.0.

Tea Oil, from Japan, is yellow in color, and has an aromatic odor and taste; a sp. gr. at 20° C. of 0.911; acid number, 8.07; saponification number, 188.3; iodine number, 88.9.

Garden-Cress Oil, obtained from the seeds by extraction with benzol to the amount of 25 per cent., has the characteristic odor of the plant; sp. gr. at 20° C., 0.9212 to 0.9221; acid number, 0.51 to 0.56; saponification number, 185.6 to 186.4; iodine number, 133.4 to 139.1.

Radish Oil, obtained by cold expression from the seed, has a yellow color, and the odor and taste of rape oil; sp. gr. at 20° C., 0.9142; acid number, 1.68; saponification number, 179.4; iodine number, 103.0.

White Mustard Oil, obtained by expression, has a dark yellow color

and neither marked taste or odor; sp. gr. at 20° C., 0.9121; acid number, 1.27; saponification, 174.6; iodine number, 103.0.

Black Mustard Oil, obtained by expression, corresponds to the white mustard oil in color, odor and taste; sp. gr., at 20° C., 0.9143; acid number 1.10; saponification number, 122.3.—Pharm. Ztg., 1903, 563; from Ztschr. f. Untersuch. d. Nahr. u. Genussm.

Almond Oil—Tests of Distinction from Peach and Apricot Kernel Oils.—Dr. J. Lewkowitsch observes that a hitherto unsolved problem in fat analysis is the detection of apricot- and peach-kernel oils in almond oil. It is well known that most of the commercial "almond oil" is apricot-kernel oil, and in the trade an oil described as "*Oleum Amygdalarum Gallicum*," or "French oil of sweet almonds," is nothing else than apricot- or peach-kernel oil; genuine almond oil being sold under the name of "almond oil, English." Under these circumstances the publication by the author of a table embodying the results of his own examination of genuine almond oils and of peach- and apricot-kernel oils from different sources, including also the figures obtained some years ago by a German firm from pure oil of Valencia almonds, will be consulted with advantage—the table exhibiting the numbers which are usually ascertained in the examination of fats, and the color reactions obtained with Bieber's nitric acid test and the "phloroglucinol test" proposed (in 1901) by Chwolle. While the figures given in this table seem to give no information of a discriminative nature, the color tests referred to, and particularly Bieber's, may be regarded as available, within certain limits, for the distinction of genuine almond oil from the substitutes named. Bieber's test consists in treating 5 measures of the oil with 1 measure of a mixture of equal parts (by weight) of sulphuric acid, fuming nitric acid, and water—the reagent being preferably prepared fresh for each set of tests. All the genuine almond oils—from Valencia, Sicily (sweet), Mazagan (bitter), Indian (small), and Mogador (bitter) almonds—remained colorless, while peach-kernel, although colorless at first, became pink, and the apricot-kernel oils all showed immediate pink colorations, varying according to source from full pink to very slightly pink. The author considers this test available for detecting an admixture of 33 per cent. of apricot oil with genuine almond oil, but that it would be somewhat hazardous to pronounce judgment in the presence of 25 per cent., such being colored only very slightly. The "phloroglucinol test," which consists in the addition of a $\frac{1}{10}$ per cent. ether-solution of phloroglucin to the oil in the presence of nitric acid, is not so available, and must be applied with much care, since it produces a slightly crimson coloration with the oils from Mazagan and Indian almonds, but no crimson color with the other genuine almond oils above mentioned; but with peach-kernel and apricot-kernel oil it produces a deep crimson coloration, this being, however, less deep with some varieties of apricot-kernel oil (from Mogador and Californian apricots).—Pharm. Journ., May 14, 1904, 651.

Carnauba Wax—*Source, Collection and Uses*.—The following information concerning "carnauba wax" is given in "Pharm. Weekblad" (4, 78-79): It is collected in Brazil, especially along the banks of the Jaquariba, in the provinces of Ceará and Parahyba. The leaves, after being gathered, are left to dry in the sun for two or three days, when the wax can readily be brushed or scraped from the surface owing to the shrinkage of the leaves. The white powder thus obtained is put into a vessel of hot water, when it melts, floats, and can be removed from the surface or left to cool. When quite cold it forms a hard, somewhat yellow, or pale greenish wax. Two to five thousand leaves are necessary to give 15 kilos of the wax. The yearly export is about 1,000 tons. It is usually packed in bags containing about 90 kilos, and is chiefly sent to Hamburg. It melts at 84° C., and has specific gravity of 0.995. It is largely used in the preparation of church candles to prevent guttering, in the manufacture of shoe paste, and for phonograph and gramophone records. About 10 per cent. of it added to stearin, paraffin, or ceresin raises their melting-points and increases their hardness and lustre. It is also used in the manufacture of sealing-wax, waxed colored papers and other tissues, wax varnishes, and Swedish matches.—Pharm. Journ., Feb., 1904, 246.

Coco-nut Fat—*Utilization as a Butter Substitute*.—It is stated in "Bull. Dep. Agric., Jamaica" (1, 114) that the fat of the coco-nut, more or less freed from liquid fat, and deprived of odor, is coming into very general use as a substitute for butter, being supplied under different names in different countries. Thus, in Germany it is called "palmin;" in France, "vegetaline;" in England, "nucoline;" and in India (Pondicherry) it is manufactured under the name of "cocotine." More recently it has also been made at Kingston, Jamaica, and it is claimed that this purified fat was first invented at Silverton, in that island.—Pharm. Journ., August 8, 1903, 237.

Coco-nut Fat—*Detection in Lard*.—The successful deodorization of coco-nut oil has resulted in the production from it of a vegetable fat, suitable and much used for various culinary purposes, and also for adulterating other fats. F. Morrschock has found that its presence in lard can be determined by shaking the suspected sample with twice its volume of 95-per cent. alcohol at 60° C. or thereabout. The alcoholic solution is evaporated, and its refraction, saponification number and iodine value determined. These figures were found for three samples of genuine lard to be + 2.8, + 2.7, + 3.4; 192.2, 193.2, 194.1, and 69.38, 70.11 and 69.13 respectively. Lard with 10 per cent. of coco fat yielded — 3.4; 221.6 and 46.56; with 5 per cent. — 0.1; 206.6 and 56.93 respectively. Hence the method would appear to be well adapted for the detection of this adulteration.—Pharm. Journ., June 11, 1904, 800; from Zeitschr. f. Unters. Nahrungs. u. Genussm., 7, 586.

Cotton-seed Oil—*Industrial Production in India*.—A monograph has

recently been published by Mr. James Mollinson, Inspector-General of Agriculture in India, in which he gives very interesting information concerning the cotton-seed oil industry and the establishment of cotton-seed oil mills in India. A comparison of the prices of various oil-seeds is shown, together with fluctuations, cost of freight and other charges for export of cotton-seed, prices in Europe, etc. Reports are also submitted on feeding-cake, and the results of analyses are given. As regards the introduction of machinery into India for the pressing of seed, it is pointed out that the new type of British machinery is capable of dealing with Indian cotton-seed as successfully as the better class of American machinery.—Chem. and Drugg., Jan. 30, 1904, 188; from "Agricultural Ledger."

Cotton-seed Oil—Manufacture of the Commercial Product.—R. B. King gives an interesting description of the method used industrially for purifying and otherwise utilizing the crude cotton oil supplied from the oil mills. This oil is purchased by the refiner, principally on the basis of the amount of free fatty acids present, but also on that of color, odor, etc.—a good oil not containing over $1\frac{1}{2}$ per cent. of free fatty acid and refining at a loss not exceeding four or five per cent. Knowing the amount of fatty acids the oil contains, it is easy for the refiner to know the percentage of soda lye to use to refine the oil. The crude oil is now placed in a tank, which contains an agitator and a steam coil for heating the oil. Agitate the oil, and add gradually about ten per cent. solution of caustic soda, specific gravity fifteen degrees, Baumé alkalimeter scale; now heat up by means of steam. Continue agitation until the fatty acids are neutralized and the coloring matter and gum separate from the oil. Now stop agitation, and let the soap stock, as it is called, settle to the bottom of the tank. Draw off the clear oil from the soap stock into another tank, and treat it with dilute muriatic acid to remove any odor or trace of soda lye. The oil is now filtered, and called "Summer Yellow." The color should be pale straw, and have a sweet taste and neutral or bland odor. This is the oil that sells for olive oil, sweet oil, and miner's yellow. By submitting this oil to a temperature of thirty-two degrees Fahrenheit, the stearin is chilled, and then pressed out from the olein. The stearin is the yellow base for butterine, and is now used in large quantities, and is as near a neutral and harmless fat as we can use. If the Summer Yellow is prime in color, in odor, it is easily bleached by Fullers' earth, or a one pint solution of bichromate of potash (saturated), to which add one ounce of C. P. sulphuric acid when cool. Add this to five gallons of the oil, agitate, and then expose to sunlight until it is bleached white. If the acid process is used, wash the oil with warm water, and neutralize the acid by using weak soda lye. Either process makes the so-called Summer White oil, from which, by chilling, white stearin is obtained, this being the base of the various lard compounds, and sometimes the whole article.—Proc. Ark. Pharm. Assoc., 1903, 44-47.

Cyclogalliphoric Acid—*A New Fatty Acid Obtained from Nut-galls.*—Hermann Kunz-Krause and Paul Schelle have obtained from the residues remaining in the industrial production of tannin from nut-galls by means of ether a new crystalline acid, which is particularly interesting because it constitutes the initial member of a new group of plant substances which the authors designate by the general term of "cyclic-fatty acids," the name given to the new acid under consideration being "cyclogalliphoric acid." From the residue mentioned, which, after the removal of gallic and ellagic acids, etc., constitutes a salve like mass, green colored by chlorophyll, and of peculiar odor, the new acid is extracted by means of glacial acetic acid, which yields crystals on standing, and then are freed from enclosed acetic acid and purified by recrystallization from alcohol or petroleum spirits, decolorization with animal charcoal. It is absolutely insoluble in water, but soluble in the organic solvents and carbon disulphide. The exhaustive investigation of the authors show this new acid to be a monobasic oxycarbonic acid, having the formula $C_{21}H_{36}O_3$. It forms an addition compound with two atoms of iodine, and appears to be the first naturally-occurring representative of a new series of bodies which yield on the one hand by their decomposition true fats, and on the other purely aromatic bodies that in nature are formed in the vegetable and animal cell.—Arch. d. Pharm., 242, No. 4 (May 9, 1904), 256-288.

Lard—Iodine Absorption Number.—H. D. Richardson finds that also the limit of 60 as the Huebl figure for pure lard, adopted by the U. S. Bureau of Agriculture is generally sufficiently high for the leaf fat of the kind of hog generally marketed in America, yet perfectly genuine lard may give figures ranging from 50 to 85. This higher value is met with in the lard of mast-fed hogs which are raised in a semi-wild condition in the woods. The lard with the lower iodine value is firmer than that from mast-fed hogs, and has a better market value. These hogs are mostly corn-fed for a time before slaughtering. It appears, therefore, that although the average iodine figure for pure American lard as found in the market falls below 60, it does not follow that a specimen giving a higher result is necessarily adulterated.—Journ. Amer. Chem. Soc., 26 (1904), 374.

Linseed Oil—Unsaponifiable Components.—Dr. G. Fendler reports the result of studies undertaken to give an authoritative opinion concerning certain characters and properties of linseed oil, as follows: (1) The content of unsaponifiable matter in linseed oil is not increased by spontaneous oxidation, nor by "blowing" or boiling it to form varnish. (2) The normal unsaponifiable content does not exceed 2 per cent. (3) For the exact determination of unsaponifiable content in linseed oil, duplicate saponification is absolutely necessary—a single saponification yielding values that are too high. (4) Expressed linseed oil contains no more unsaponifiable substance than the oil obtained by extraction. (5) For the

determination of small quantities of mineral oils in linseed oil, the iodine number of the unsaponifiable components and their solubility in warm 90-per cent. alcohol gives decisive figures. The iodine number of the unsaponifiable components is between 80 and 90, and their solubility in warm 90-per cent. alcohol is complete with the exception, possibly, of mere traces, while mineral oils remain undissolved.—*Apoth. Ztg.*, 19, No. 36 (May 4, 1904), 306; from *Ber. d. d. pharm. Ger.*, 1904, 149.

Linseed Oil—Determination of Unsaponifiable Matter.—C. Niegemann has found in eighteen determinations on pure linseed oil that the maximum amount of unsaponifiable matter was 2.15, the minimum 0.74, and the average 1.35 per cent., this average being exceeded in seven of the samples. The author, therefore, concludes that it is not justifiable to condemn a linseed oil solely because the amount of unsaponifiable matter exceeds the highest limit (1.3 per cent.).—*Pharm. Journ.*, March 26, 1904, 428; from *Chem. Zeit.*, 28, 97.

Mustard Seed Oil—Constants and Characters.—F. W. Widmayer communicates some practical information concerning the character, yield, etc., of the fixed oil of mustard seed, which is largely obtained as a by-product in the manufacture of powdered mustard from both black and white (or yellow) mustard seed. The oil from yellow seed is of a greenish yellow color, that of the brown seed a much darker shade. Both have but little odor and a mild, not unpleasant taste. It is a semi-drying oil. The analytical data showing maximum and minimum results by M. L. Tolman and L. S. Munson on five samples are as follows:

Specific gravity at 15.50° C.			{ 0.9147 0.9193
Butyro-refractometer reading (15.50°)	74.5	to	76.5
Index of refraction at 15.50°	1.4750	to	1.4762
Maumené number	61.4	to	79.4
Specific temperature reaction	130.9	to	190.3
Hübl number	98.4	to	113.0
Saponification value	173	to	182.8
Melting point of fatty acids	20.8°	to	21.5° C.
Free fatty acids as oleic .....	.13	to	1.13%.
Solidification from	—8°	to	—18°.

One remarkable feature of this oil is its penetrating or diffusing power. Barrels that will hold olive, cotton-seed, or petroleum oils or even new oil or alcohol barrels invariably leak on being filled with it, and it is said by one who has had extensive experience in the mustard business that it has been known to come through a tank which had stood a pressure of 80 pounds of steam.—*Drug. Circ.*, 48, No. 1 (Jan., 1904), 8.

Peanut Oil—Use for Soap Stock in Place of Palm Oil.—The "American Soap Journal" observes that a year or so ago palm oil suddenly sprang into the breach when other soap stocks had become uncomfortably ex-

pensive ; and now it seems that peanut oil has come to perform a similar mission. Not that American peanut oil has suddenly become plentiful, for it is the Indian (and African) peanut which has been so plentifully supplied to European oil mills that the latter can offer us oil at an unusually low price. It is claimed that something like ten thousand barrels of peanut oil have lately been purchased by American soap manufacturers. Peanut oil is probably preferable (for soap-making purposes) to cotton oil, and, if its price is as low or lower than the latter, will be used freely. India and Africa raise immense quantities of peanuts for oil-making purposes, and ship them regularly to Europe—especially Marseilles—where this soap stock is fairly well introduced by this time. But until now no such large use has been made of peanut oil in this country. Whether the present position of this raw material will remain unchanged for any length of time, is a question.—*Drugg. Circ.*, 48, No. 6 (June, 1904), 122.

Rice Oil—Characters and Constants.—According to C. A. Browne pure unadulterated rice bran or meal contains about 15 per cent. of oil, semi-solid in winter, and in summer a brownish liquid with a deposit of crystalline fats. Its sp. gr. is 0.8907 ; melting-point, 24° C. ; acid number, 166.2 ; saponification number, 193.5 ; ester number, 27.3 ; iodine number, 91.65 ; Reichert-Meissl number, 1.1. It is not perfectly transparent until the temperature reaches 47° C. The author attributes the very high acid content—calculated to be 83.5 per cent.—to the presence of a lipase in the bran, which, acting on the glycerides, liberates the fatty acids. The presence of this ferment in a very active state in the rice bran, as well as its powerful hydrolyzing effect on the glycerides of the oil was proven by the experiments made.—*Journ. Amer. Chem. Soc.*, 25 (1903), 948.

CARBOHYDRATES.

Cellulose—New Process of Determination.—Zeisel and Strisire communicate the following new method for the determination of cellulose, which depends on the fact that those portions of wood which are not cellulose or oxycellulose, are, by means of potassium permanganate, rendered completely and easily soluble, even in the cold, partly in water and partly in 2.5 per cent. ammonia solution, thus leaving the cellulose and oxycellulose free, and easily separable : From 1 to 1.5 Gm. of the substance under examination is disintegrated in dilute nitric acid, and with refrigeration and constant agitation, treated with 3 per cent. potassium permanganate, 1 Cc. at a time, until the red color thus produced will remain permanent for thirty minutes (which at the most, will require about two hours' treatment). The precipitated manganic oxide and surplus permanganate are removed by sulphurous acid or sodium sulphite in dilute sulphuric acid ; the residue of filtration, after thorough washing, is treated for forty-five minutes with a 2.5 per cent. solution of ammonia at 60° C. (140° F.), then washed, first with hot water, then with alcohol and ether, dried and

weighed. The results of various examinations of parts of the same sample by this method agree very closely, but are much lower than those reached by Schulze's method. This is easily accounted for, however, as in the latter the cellulose obtained contains 5.5 per cent. of methoxyl, while those of Schulze-Henneberg, or those obtained by the permanganate process, contain at the very outside barely half of 1 per cent. Beside this the permanganate process does away with the preliminary extraction by alcohol and water, and the tedious treatment with the oxidizing agents (which alone requires fourteen days). Above all, the resulting determinations of this (the permanganate) method are more accurate, since the hemicelluloses, especially the manoxycellulose, are removed by being rendered soluble, thus leaving the cellulose, pure and simple.—West. Drugg., Feb., 1904, 39; from Ztschr. f. Untersuch. d. Nahr. u. Genussmittel.

Nitro-cellulose—Addition of Nitro-glycerin in the Preparation of Photographic Films.—It is stated in "Chem. Ztg." (1903, 1041) that although nitro-cellulose has in recent times been much used for producing photographic films, pure nitro-cellulose gives a brittle film, so that it is necessary to add resin, oil, camphor, and other substances, in order to make it flexible enough for photographic purposes. These additions, however, have a drawback, that the resin and oils have a deleterious effect upon the films. It has been found that the addition of from 5 to 20 per cent. of nitro-glycerin to the films fulfills all the requirements, and gives a very satisfactory result.

Paper—Material for its Manufacture.—The "Western Druggist" (January, 1904, 11) says that paper can be manufactured out of almost anything that can be pounded into a pulp. Over fifty kinds of bark are said to be used, also banana skins, bean stalks, pea stalks, cocoanut fiber, straw, sea and fresh-water weeds, and many kinds of grass are all applicable. It has also been made from hair, fur, wool, and from asbestos, which furnishes an article indestructible by fire. Leaves make a good strong paper, while the husks and stems of Indian corn have been tried.

Viscin—Purification.—The proposed utilization of the glutinous product of *Viscum album*, called viscin, but popularly known as "bird lime," for dermatological purposes has given rise to the suggestion of various methods for its purification. Dr. Conrad Stich, discussing the difficulties enumerated in conducting these methods on the small scale, directs attention to that proposed by v. Zumbusch, which consists in the solution of the crude viscin in benzin, and the prolonged exposure of the solution to the bleaching influences of sunlight. He contends, however, that the production of a colorless solution of viscin under these conditions is not due to the bleaching effect of the sun's rays, but to the sedimentation of the chlorophyll, which is simply suspended in the benzin solution. This effect, which requires several weeks, may be hastened somewhat by the addition of fine clay, zinc oxide, etc.—Pharm. Zeit., 48, No. 52 (July 1, 1903), 525.

Saccharose—Enumeration of Fifty-Seven Plants Containing it.—E. Bourquelot, by observing the action of invertin on the sugar-containing portions of various plants, has demonstrated the presence of saccharose in fifty-seven species. Since invertin causes the hydrolysis of certain polysaccharides, such as gentianose, raffinose, hexotriose and hexotetrose, when these bodies are present the observed rotation, after inversion, will be higher than is theoretically required for saccharose. Thus, invertin transforms one molecule of saccharose into a molecule of levulose and glucose; gentianose into levulose and two molecules of glucose; raffinose into a molecule of glucose, levulose and galactose, and so on. Invertin may, therefore, be considered a specific reagent for saccharose either free or combined; but, when combined, the observed rotation of the inverted sugars will be higher than the theoretical requirements for a simple molecule of saccharose. From these data the presence of cane-sugar has been demonstrated in the fresh subterranean parts of the following plants: *Medicago sativa*, *Pæonia officinalis*, *Tamus communis*, *Gentiana lutea*, *Neottia nidus-avis*, *Colchicum autumnale*, *Orobanche cruenta*, *Carum bulbocastanum*, *Scrophularia nodosa*; in the fresh bark of *Betula alba* and *Fraxinus excelsior*; in the fresh herb of *Pellia epiphylla*; in the fresh male catkins of *Alnus glutinosus*; in the fresh pericarp of *Cocos yatay* and of *Amygdalus communis*; in the dried fruits of *Phellandrium aquaticum*, *Coriandrum sativum*, *Carum carui*, *Petroseilinum sativum*; and in the dried seeds of *Asparagus officinalis*, *Ruscus hypoglossum*, *R. aculeatus*, *Convallaria majalis*, *Schænocaulon officinalis*, *Allium cepa*, *A. porrum*, *Asphodelus ramosus*, *Tamus communis*, *Cocos yatay*, *Chamærops excelsa*, *Areca catechu*, *Erythea edulis*, *Astrocaryum vulgaris*, *Cenocarpus bacaba*, *Sagus rhumphii*, *Phylelephas macrocarpa*, *Pæonia officinalis*, *Myristica moschata*, *Sterculia fetida*, *Ricinus communis*, *Hydnocarpus heterophyllus*, *Tropæolum majus*, *Pistacia vera*, *Ervum lens*, *Ceratonia siliqua*, *Trigonella fenum-græcum*, *Gleditschia triacanthos*, *Medicago sativa*, *Melilotus leucantha*, *Medicago lupulina*, *Amygdalus communis*, vars. *dulcis et amara*, *Aucuba japonica*, *Anamirta cocculus*, *Strychnos potatorum*, *Cucurbita maxima* and *Sesamum indicum*. The following plants showed the presence either of saccharose accompanying polysaccharides or of those complex bodies which yield saccharose to the action of invertin: *Helianthus tuberosus*, *Loroglossum hircinum*, *Allium cepa*, *Ficaria ranunculoides*, and *Hibiscus esculentus*.—Pharm. Journ., Oct. 17, 1903, 549; from Journ. Pharm. Chim. [6], 18, 241.

Saccharose—Compounds with Certain Metallic Salts.—A compound of saccharose with sodium iodide has already been prepared and described. While endeavoring to reproduce this compound by the same method, D. Gauthier obtained a crystalline product in very distinct prisms. He proves the formula of this substance to be $C_{12}H_{22}O_{11}NaI_2 \cdot 2H_2O$, differing from that found by Gill. However, this formula is analogous to those proved for

compounds of saccharose with potassium iodide and lithium iodide: $C_{12}H_{22}O_{11}, KI, 2H_2O$; $C_{12}H_{22}O_{11}, LiI, 2H_2O$. The metallic sulphocyanides play parts analogous to those of chlorides, bromides, and iodides, and the author succeeds in obtaining definite products with some of these and saccharose. Ammonium, potassium, and sodium sulphocyanides give beautiful prismatic crystals, whose composition is represented by the formulae: $C_{12}H_{22}O_{11}, NH_4CNS, 1.5H_2O$, $C_{12}H_{22}O_{11}, KCNS, H_2O$, $C_{12}H_{22}O_{11}, NaCNS, H_2O$. Barium sulphocyanide also gives a compound showing prismatic crystals, and having the formula $C_{12}H_{22}O_{11}, Ba(CNS)_2, 2H_2O$.—Chem. News, April 8, 1904, 179; from Compt. rend., 88 (1904), No. 10.

Sugar—Improved Volumetric Method of Quantitative Estimation.—In view of the difficulties encountered when using Fehling's Solution in the valuation of sugar solutions—*gravimetrically*, because of the need of apparatus not always conveniently in reach; *volumetrically*, because of the difficulty in recognizing the end reaction—Dr. Herm. Ley and Herm. Dichgens conceived the idea of employing primarily Fehling's Solution in excess, heating as usual, filtering off the reduced cuprous oxide, and treating an aliquot part of the filtrate with a standardized solution of potassium ferricyanide, also in excess. This latter excess is then titrated in the well-known manner with potassium iodide and sodium thiosulphate in a medium acidulated with HCl, using starch paste as indicator—the reaction here being sharp and easily recognized. The figures thus obtained permit the accurate calculation of the quantity of Fehling's Solution originally consumed, and thus of the percentage of glucose in the substance examined.—Pharm. Ztg., 48, No. 68 (Aug. 26, 1903), 689-670.

Sugars—Separation.—The determination of the quantity of maltose in the presence of glucose is frequently required, and is an easy matter when the two sugars exist in such amounts that the reducing power and the polarimetric value can be determined. Grimbert suggests a method of separation which depends on the solubility of maltosazone in acetone and the insolubility of glucosazone in that solvent. He takes 20 Cc. of the sugar solution and adds 1 Cc. of phenylhydrazine and 1 Cc. of glacial acetic acid. The mixture is warmed on a water-bath for an hour, and the osazone is collected and washed with water and then with benzene. It is then dried at 100° C. The whole is next treated with a mixture of equal parts of acetone and water, which dissolves out the maltosazone and leaves the glucosazone. The separation is claimed to be very exact.—Chem. and Drugg., Feb. 20, 1904, 310; from Rép. de Pharm., 1903, 497.

Sugar Determinations.—Aids to recognition of end-point when using Fehling's Solution, which see under "Pharmacy."

Reducing Sugars—Production of their Phenylurethanes.—It is known that phenylisocyanates react on polyatomic alcohols belonging to the mannite group, as well as on saccharines, to give insoluble phenylurethanes.

L. Maquenne and W. Goodwin have applied the same reaction to the reducing sugars and to polyoses without previous hydrolysis. The sugar with a slight excess of carbanile is diluted with two or three times its volume of anhydrous pyridine and then brought to boiling-point. The reaction is rapid, and, after a quick drying process, a crystalline salt separates out. By this method, hitherto unknown phenylurethanes are prepared, as those of the pentoses, hexoses, and certain hydrolysable polyoses, such as lactose, trehalose, and melezitose. Their composition only varies between very narrow limits; however, the analyses are in all cases in perfect accordance with the theoretical composition.—Chem. News, April 8, 1904, 179; from Compt. rend., 88 (1904), No. 10.

Glucose—Sodium Monosulphide as Indicator in Estimations by Fehling's Solution.—In order to assist in the determination of the complete decolorization of Fehling's Solution, and consequently the end of the reaction in glucose estimations, L. Beulaygue finds sodium monosulphide of great value. For this purpose the monosulphide is dissolved in ten times its weight of distilled water. A drop of this solution on a piece of filter-paper acts as an indicator with the reduced Fehling Solution, for when the liquid is not fully reduced a black or brown stain of copper sulphide is produced. This disappears directly, reduction is complete, the filter-paper stain remaining colorless. The end of the reaction can in this manner be very sharply defined.—Chem. News, Feb. 5, 1904, 71; from Compt. rend., 88 (1904), No. 1.

Stachyose—Identity with Manneotetrose.—C. Tanret finds that "stachyose," the sugar isolated by de Planta and E. Schulze from *Stachys tubifera*, is a tetrose identical in every respect with the "manneotetrose" (see Proceedings, 1903, 750) previously discovered by him in manna. It has the formula $C_{24}H_{42}O_{21}$, is completely hydrolyzed by 3 per cent. sulphuric acid into four molecules of monoses—two being galactose, one glucose, and one levulose.—Pharm. Journ., Aug. 15, 1903, 269; from Compt. rend., 136, 1569.

Stachyose—Physical Properties.—C. Tanret describes the method of preparing stachyose, its constitution, and physical properties, such as its solubility, rotatory power, and crystalline form. With the exception of the crystalline form, the author finds no difference between stachyose and manneotetrose. On the other hand, Wyronboff finds the crystalline form of these two sugars to be identical, and that they are one and the same sugar, namely, a tetrose with the formula $C_{24}H_{42}O_{21}$.—Chem. News, June 10, 1904, 287; from Bull. Soc. Chim. (3), xxix, No. 16.

Glycogen—Formula of Brückner's Reagent.—The following formula and process for preparing Brückner's reagent for glycogen is given by a correspondent of the "Apotheker Zeitung" (Mar. 2, 1904, 142): Dissolve 100 Gm. of potassium iodide in sufficient hot water to make 1000 Cc. Add

mercuric iodide in small quantities at a time, as long as dissolved, and in slight excess. On cooling, decant the clear solution from the crystalline (red) deposit, add a few crystals of potassium iodide, and preserve the solution protected from the light.

ORGANIC ACIDS.

Organic Acids—Solubilities of their Lead, Calcium, Barium and Silver Salts.—With the object of establishing the foundation for a method of separating the organic acids that may be present in wines, A. Partheil has determined the solubilities of the lead, calcium, barium and silver salts of malic, succinic, tartaric and citric acid in water and alcohol at certain temperatures, and publishes the results with the details of experiments. These may be consulted by those interested in Arch d. Pharm., 241, No. 5 (July 31, 1903), 412-420.

Oxalo-Niobates—Conditions of Formation and Characters.—Franz Russ, starting with colombite as his raw material for the preparation of niobic acid, discusses the different methods of treatment for this purpose, and passes to the preparation of oxalo-niobic acid and its salts. Oxalo-niobate of potassium is obtained by fusing together in a platinum crucible 16 Gm. of fused niobic acid with 24.7 Gm. of carbonate of potassium. After fusion, the mass is taken up with water and the insoluble residue (about 0.185 Gm. in weight) is separated; the solution is mixed with another solution containing 45.1 Gm. of oxalic acid. The return is about 50 Gm. The salt, which has the formula $\text{Nb}_2\text{O}_5 \cdot 3\text{K}_2\text{O} \cdot 0.6\text{C}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$, is crystalline, and occurs in spheroidal agglomerations. The sodium salt, which is more difficult to obtain, contains $8\text{H}_2\text{O}$, the ammonium salt $3\text{H}_2\text{O}$, that of rubidium $4\text{H}_2\text{O}$. All the attempts made for the preparation of the alkaline salts of the type $2\text{Nb}(\text{C}_2\text{O}_4\text{K})_3 = \text{Nb}_2\text{O}_5 \cdot 5\text{K}_2\text{O} \cdot 10\text{C}_2\text{O}_3$ were failures. Solutions of niobic and of oxalic acids furnish crystals of which the composition varies considerably. Under certain experimental conditions, the author obtained by analysis figures comparable with those required by the formulæ $3\text{Nb}_2\text{O}_5 \cdot 2\text{C}_2\text{O}_3 \cdot 20\text{H}_2\text{O}$, $\text{Nb}_2\text{O}_5 \cdot \text{C}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$, and $\text{Nb}_2\text{O}_5 \cdot \text{C}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$. In the presence of a small quantity of oxalic acid there is a tendency towards the formation of the body $\text{Nb}_2\text{O}_5 \cdot \text{C}_2\text{O}_3$; in the presence of an excess of this acid the tendency is to form $\text{Nb}(\text{C}_2\text{O}_4\text{H})_3$, from which we get the formation of the complex mixtures like $\text{Nb}_2\text{O}_5 \cdot 5\text{C}_2\text{O}_3 \cdot 21\text{H}_2\text{O}$. An aqueous solution of oxalo-niobate of potassium, $\text{Nb}_2\text{O}_5 \cdot 3\text{K}_2\text{O} \cdot 0.6\text{C}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$, at 2 per cent., precipitates the alkaline earthy salts and a large number of the metallic salts, but the salts of manganese, zinc, mercury (Hg'') are not precipitated. The decomposition of the binoxalate of barium by an excess of niobic acid, leads to the formation of the salt $\text{Nb}_2\text{O}_5 \cdot 5\text{BaO} \cdot 10\text{C}_2\text{O}_3 \cdot 20\text{H}_2\text{O}$. The action of dry chlorine gas transforms the oxalo-niobate of potassium into Nb_2O_5 and KCl , even at a temperature near to 100°C . Tetrachloride of carbon decomposes it in the

same manner, but the reaction only commences at about 200° C. With hydrochloric acid the decomposition takes place at a red heat. Sulphide of carbon gives sulphides at a temperature below red heat.—Chem. News, Oct. 9, 1903, 185; from Zeitschr. Anorg. Chem., xxxi., 42.

Formic Acid—Non-Toxicity of its Salts.—L. Garrigue calls attention to the remarkable results obtained by the administration of sodium and calcium formate. Having established by experiments on rabbits that these salts were devoid of toxicity he experimented on himself, and found that he could take 45 grains of sodium formate with each meal without experiencing any inconvenience. He has taken 15 grains of the salt daily for a month with no ill effects. The first result of the administration of sodium formate is to increase the arterial pressure. The patient experiences a feeling of well being, becomes cheerful, sleeps well, and in the case of tubercular disease the appetite is markedly increased. At the same time the amount of urea excreted is greatly increased.—Pharm. Journ., May 21, 1904, 681; from Compt. rend., 138, 837.

Aluminum Succinate.—Presence in *Orites excelsa*, which see under "Materia Medica."

Acetic Acid—Contamination of Traces of Lead.—C. T. Bennett calls attention to the fact that practically all commercial samples of acetic acid contain traces of lead. This is not evident until the acid has been neutralized, when the reaction with hydrogen sulphide is very marked, although the coloration produced in the acid itself is barely perceptible. The reaction is particularly noticeable in the concentrated solutions of ammonium acetate (1 to 4 and 1 to 7) of trade, a number of samples of which the author has recently examined with a view to determine the proportion of lead present. Although the quantity of lead in the worst sample did not exceed 1 in 10,000, this proportion appears somewhat alarming, unless one takes into consideration how small an equivalent of these concentrated solutions is generally taken. The method adopted by the author for the estimation of the proportion of lead consists in matching the color produced by 1 Cc. of neutral acetate solution and 40 Cc. of solution of hydrogen sulphide, with a standard solution of lead acetate under the same conditions, using Nessler glasses. A close approximation can be thus obtained.—Chem. and Drugg., Sept. 5, 1903, 436.

Vinegar—Determination of Origin.—Divai claims to be able to decide the origin of several kinds of vinegar by the following characters and tests: *Wine vinegar* should yield 6 to 9 per cent. of acetic acid, and 1.7 to 2 per cent. of extract. If the vinegar be neutralized with soda, it should not reduce Fehling's Solution, and if mixed with two volumes of alcohol, it should not deposit gum or dextrin. It contains cream of tartar. *Glucose vinegar* differs from this in reducing Fehling's Solution when neutralized, and in depositing when treated with alcohol. It does not contain cream

of tartar. *Malt vinegar* contains only up to 3 per cent. of acetic acid, but yields 4 to 5 per cent. of extract. It precipitates abundantly on mixing with alcohol. *Cider and berry vinegar* contain 3 to 4 per cent. of acetic acid, and 1.4 to 1.6 per cent. of extract. They yield yellow precipitates with acetate of lead.—Chem. and Drugg., June 25, 1904, 1001; from Ann. Chim. Analyt., 1904, 180.

Vinegar—Determination of the Presence of Mineral Acids.—Schidewitz recommends the following simple method for recognizing the presence of mineral acids in vinegar: Add to the vinegar an equal volume of alcohol and one drop of a solution of methyl orange of about one-half of 1 per cent. strength, titrate with $\frac{1}{10}$ normal alkali solution; finally, add for each 3 Cc. of the titrated liquid 1 Cc. alcohol. Under these conditions the acetic acid has no action whatever on the indicator. If the vinegar is artificially colored the author uses papers of methyl orange.—Nat. Drugg., Febr., 1904, 39; from "Chemiker Zeitung."

Acetates of the Alkaline Earths—Conditions of Formation and Distinctions.—Albert Colson finds that calcium and magnesium acetate, unlike the barium salt, do not form an aceto-chloride, analogous to $\text{BaCl}_2\cdot\text{H}_2\text{O}_2$, which the author has obtained crystallized with one molecule of acetic acid. In the attempt to produce these compounds, the acetates were prepared free from water by the addition of acetic anhydride to the glacial acetic acid employed. Lime is slowly attacked by this mixture, after a lapse of time the mass greatly increases in volume, giving an amorphous mass five or six times the size of the original lime. This compound has the constitution $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{C}_2\text{H}_4\text{O}_2$. If a small quantity of lime be treated by boiling with a very large excess of the acid mixture the same body is obtained in small, hard crystals. Pure acetic acid is completely without action on marble. Crystalline lime, obtained in the electric furnace, rapidly loses its transparency in acetic acid and increases five or six times in volume in half an hour without any great rise in temperature. It appears to become crystalline in several weeks. Acetic anhydride, although it reacts with lime in a similar manner, with the evolution of considerable heat under ordinary conditions, is quite inactive when in contact with that body in sealed, perfectly dry tubes, even at a boiling temperature. If, however, a little acetic acid be added to the mixture, the lime is acted on, even in the cold, as with acetic acid alone.—Pharm. Journ., Febr. 6, 1904; from Compt. rend., 137, 1061.

Lead Acetate—Pharmacopœial Definition of Reaction with Litmus.—Thomas S. Barrie says that while the B. P. states that lead acetate is slightly acid to litmus, this salt in his experience is often slightly alkaline, and he therefore suggests that the official description at this point should be, "Its solution in water may be slightly acid or slightly alkaline."—Pharm. Journ., Jan. 23, 1904, 85.

Iodoacetone (Monoiodoacetone) is produced when acetone and iodine are brought together, and furnishes, particularly, in fresh solution, a strong caustery, is prepared by dissolving 4 p. of iodine in 10 p. of acetone, and is applied by penciling the surface of boils in formation. When applied to the boils already formed the penciling will cause severe pain, but of short duration.—Wien. Med. Wchschr., 1903, No. 28.

Benzoic Acid—Tests for Cinnamic Acid.—Henrik Essell says that in the examination of benzoic acid for cinnamic acid depending on the formation of benzaldehyde by the action of permanganate, it may occur that as much as 5 per cent. of cinnamic acid may escape notice unless certain precautions are observed. In his experience the test is best carried out as follows: 0.2 Gm. of the *finely* powdered benzoic acid and 5 Cc. of $\frac{1}{10}$ permanganate solution are mixed in a test-tube of wide diameter and securely corked. When the red color is discharged—usually after a few minutes—5 Cc. more of $\frac{1}{10}$ -permanganate solution are added, and the tube is set aside for 15–30 minutes, with frequent shaking. If then the cork is lifted the odor of benzaldehyde will be strongly perceptible in the presence of 5 per cent. of cinnamic acid, and even distinctly recognizable if only 1 per cent. is present in the benzoic acid under examination.—Pharm. Ztg., 49 No. 26 (March 30, 1904), 272.

Sulphobenzoate of Sodium—Preparation and Possible Therapeutic Value.—Dr. Hugh Woods remarks that the valuable properties of carbolic acid, formic acid and sulphuric acid are so well known that a compound composed of the whole three of them can hardly fail to be of interest to the medical profession. The properties of a compound may, of course, differ widely from those of its constituents, but where, as in this case, there is a comparatively simple combination of the constituent compounds, it may reasonably be expected that the combination will retain some of the characteristic properties of the constituents more or less modified. The new compound alluded to, containing carbolic, formic and sulphuric acids, is designated by the author as “sulphobenzoate of sodium.” It can easily be prepared, as follows: Take sodium sulphocarbolate (B. P.) and sodium formate in the proportions of their molecular weights, boil them together in pure distilled water, evaporate the solution carefully, cool, and collect and dry the crystals deposited. The white crystalline deposit thus obtained is sulphobenzoate of sodium, and consists of very fine, silky needles. These crystals are well formed, and keep indefinitely without deliquescence or change of any kind. Without entering into the chemistry of this compound and the compounds with which it is related, it may be briefly mentioned that just as there are three isomeric sulphocarbolates, so there are three isomeric sulphobenzoates, and this being prepared from the B. P. sulphocarbolate, which is the parasulphocarbolate, the new compound is more properly designated as

Parasulphobenzoate of Sodium. Its composition corresponds to the

formula $\text{Na}_2\text{C}_7\text{H}_4\text{SO}_4 + 2\frac{1}{2}\text{H}_2\text{O}$, and it is evidently the normal salt, which must not be confounded with the parasulphobenzoate of sodium described in Beilstein's Handbook, which has the composition $\text{NaC}_7\text{H}_4\text{SO}_4 + 2\frac{1}{2}\text{H}_2\text{O}$, and is evidently an acid salt. Therapeutically administered, the author's salt, obtained as above described, is found to be devoid of unpleasant effects in all reasonable doses. Given in 15 to 30-grain doses every 3 or 4 hours, he has obtained unmistakably good results where the urine was foul-smelling in connection with rheumatic fever, and in various affections of the bladder and urinary organs, and therefore worthy of a full trial.—Chem. and Drugg., Jan. 9, 1904, 56.

Saccharin—Delicate Test.—According to W. Wauten, if a trace of saccharin is warmed with phloroglucin and sulphuric acid, a violet-black coloration is produced which, on dilution with water, becomes deep violet. The test, although extremely delicate, does not succeed, however, unless the saccharin is in a fairly pure state.—Pharm. Journ., Sept. 19, 1903, 431; from Bull. Soc. Pharm. Bruxelles.

Saccharin—Detection in Beer and Wine.—Boucher and Bounge recommend the destruction of the tannin and coloring matter in beer and wine by oxidation with permanganate before shaking out the saccharin with ether. *Beer* is acidified with a few drops of H_2SO_4 , then treated, in the cold, with excess of 1 per cent. solution of KMnO_4 , removing the excess of the latter with SO_2 before shaking out the saccharin in the usual manner. *Wine* is treated in the same way, but with the application of heat. Any salicylic acid present is also destroyed by this treatment, which has the further advantage of preventing the tendency to emulsionize during the shaking-out process.—Pharm. Journ., Aug. 22, 1903, 297; from Bull. Soc. Chim., 29, 411.

Amidobenzoic Acid Ethyl Ester — Properties.—The ethyl ester of p-amidobenzoic acid, which is prepared by esterizing p-nitrobenzoic acid, reducing the p-nitrobenzoic acid ethyl ester with lime and hydrochloric acid, decomposing the salt of p-amidobenzoic acid ester so produced by means of sodium hydrate, and purifying the product by recrystallization from alcohol, is known by the coined name of

Anesthesin, and is described by A. Ammeburg as follows: It occurs in the form of fine, white crystals, which are easily reduced to a dusty powder, and melt at $90^\circ\text{--}91^\circ\text{C}$. It is nearly insoluble in cold water, sparingly soluble in hot water, but readily soluble in alcohol, ether and benzol; also in dilute solutions of organic and mineral acids, with which it forms well crystallized salts, but insoluble in caustic and carbonated alkalies, ammonia, &c. On prolonged boiling with water, or heating with diluted alkalies, it is split into amidobenzoic acid and alcohol. Almond oil dissolves it to the amount of 2 per cent., olive oil to 3 per cent., the solutions permitting sterilization without undergoing decomposition. Such oil solutions are well adapted for its application as a local anæsthetic,

but it may also be prescribed for such purposes, in stronger form, suspended in mucilage or gum arabic, in the form of suppositories with ol. cacao, or in combination with gelatin mass. It is non-toxic, and may be used internally with advantage as an anæsthetic remedy in affections of mucous membrane of the stomach.—Apoth. Ztg., 19, No. 10 (Febr. 3, 1904), 79; from Ber. d. d. pharm. Ger., 1904, 20.

Lactic Acid—A Constituent of the Volatile Acids of Wines.—A. Partheil and Dr. H. Hübner point out that notwithstanding Béchamp many years ago had observed that the acetic acid distilled from wines must contain appreciable quantities of some other organic acid, the volatile acids obtained by distillation in the examination of wines have up to very recent times been simply calculated as acetic acid, the other soluble fatty acids—butyric, formic, etc., being present in such small quantities that they could be neglected. Experiments now communicated in detail in the comprehensive paper of these authors, prove that the appreciable quantity of acid beside acetic acid in the distillate is lactic acid, which, although non-volatile under ordinary conditions is carried over with the vapor of water. Appearing in the distillate, it gives rise to errors in the examination of wines for acetic acid, which may thus be shown to contain a quantity of volatile acids in excess of that permitted by the German excise law or by other established standards. The authors prove this by experiments undertaken with mixtures of acetic and lactic acids, as well as directly with wines previously determined to contain lactic acid. In three examples the distillate from wines contained so much lactic acid that the legal limit of acetic acid was exceeded in quantities of 0.0108 to 0.0120 Gm. per 100 Cc.—Arch. d. Pharm., 241, No. 6 (Sept. 4, 1903), 421-435.

Bismuth Lactate—Formula and Process.—The following formula and process for the preparation of bismuth lactate has been adopted, and is given in a supplement to the Dutch Pharmacopœia: Bismuth nitrate, 6, is treated with a mixture of solution of ammonia, 5, and water, 10; after standing, the supernatant liquid is decanted and the precipitate washed. When free from salts it is treated with lactic acid, 5, and the resulting solution filtered into alcohol, 95.96 per cent., 10. The precipitate thus obtained is collected, washed with alcohol, and dried. It should yield from 55 to 59 per cent. of bismuth oxide when incinerated with the aid of ammonium nitrate.—Pharm. Post, 36 (1903), 583.

Citric Acid—Detection in the Presence of Tartaric Acid.—Dr. Bernh. Merck calls attention to a method for the detection of citric acid which depends on the decomposition of the acid by concentrated sulphuric acid, resulting in the formation of gaseous carbonic oxide and acetone dicarbonic acid in solution. On adding a few drops of freshly-prepared solution of sodium nitroprusside the well-known ketone coloration is produced, and changes on the addition of acetic acid to that characteristic of ketones. In the presence of tartaric acid, however, the reaction is not available be-

cause of the black color produced by the action of concentrated sulphuric acid upon it, but it may be made available by employing in place of pure sulphuric acid a mixture of glacial acetic acid (3 to 4 parts) and sulphuric acid (6 to 7 parts), and allowing this to react for 5 or 10 minutes at 90° to 95° C. The tartaric acid is acetylated, and thus protected from the violent reaction of the sulphuric acid and consequent blackening. It is possible by this method to conveniently estimate 0.001 Gm. of citric acid, for example, if 0.1 Gm. of a 1-per cent. tartaric and citric acid mixture is heated with 4 drops of glacial acetic acid and 6 drops of concentrated sulphuric acid for about 5 minutes, then carefully rendered alkaline. If the solution is then diluted with water and treated with sodium nitroprusside and acetic acid a distinct ketone reaction will be obtained.—*Pharm. Ztg.*, 48, No. 88 (Nov. 4, 1903), 894.

Soluble Citrates—Method of Conducting the Calcium Chloride Test.—F. H. Alcock recommends the following method for conducting the calcium chloride test for soluble citrates as being more satisfactory than the usual method: Having neutralized, or rendered faintly alkaline, the aqueous citrate solution, if not so already, by means of the ten per cent. ammonia water and addition of solution of calcium chloride in such a quantity as, when subjected to the same boiling treatment for about five minutes, no precipitate makes its appearance, or only a slight one (which may be removed by filtration, if thought necessary, before adding the citrate solution), when the citrate is known to be absent (*i. e.*, in a blank experiment). Two ounces of distilled water are placed in an eight-ounce cut-down flask; raise to the boiling-point, and lower the tube containing the solution, prepared as above described, into the hot water in the flask. After from three to ten minutes, according to the quantity of citrate present, an opaque white crystalline precipitate makes its appearance which is not likely to be mistaken for the precipitate which appears in the blank experiment, and which may be calcium or aluminum or magnesium hydroxides, the last two being often found as impurities in the calcium salt.—*Pharm. Journ.*, Nov. 7, 1903, 664.

Iron and Ammonium Citrate—Cause of Variations in Color.—Willy Wobbe has made an experimental inquiry into the causes which determine the variations in color of the commercial ammonio-citrates of iron. This is listed as "green" and "red," the latter being the product obtainable and demanded in the different Pharmacopœias. Besides these, however, there is a third variety of the salt, intermediate in color, which may be designated as "yellow" iron and ammonium citrate. Latterly, the "green salt" has come into considerable demand for certain photographic purposes, and it is also preferred in some localities, notably in Saxony, for medicinal purposes. The author's experiments point out the fact that the variations in color are due to variations in the basicity of the ammonium citrate, the "green salt" containing the smallest amount of ammonia and

some free citric acid, the "red salt," a small excess of ammonia, and the "yellow salt," a decided excess of ammonia. The analytical data, given by the author, do not justify the assumption of definite chemical formulas for these several salts, which may be characterized as being variable mixtures of iron citrate and ammonium citrate. In the red and yellow citrates, the latter is to be regarded as the tribasic ammonium citrate which, by heating, splits off ammonia and becomes a bibasic or monobasic salt, while in the green salt, the acid ammonium citrate can with certainty be accepted as a component.—Apoth. Ztg., 18, No. 86 (Oct. 28, 1903), 754-756.

Citric and Tartaric Acids and their Salts—Estimation of Lead Contamination.—Charles T. Bennett, in view of a number of prosecutions under the Sale of Food and Drugs Act, calls attention to the importance of fixing a pharmacopoeial standard for the amount of lead that is permissible in citric and tartaric acids and their salts, it being a well-known fact that it is practically impossible to obtain tartaric and citric acid on a commercial scale, absolutely free from lead. The best available samples contain from 10 to 30 parts per million, while some contain as much as 50 parts per million. The author considers that a maximum of 25 parts per million might be safely adopted as harmless, but that it might prove practicable later on, as greater care is taken by the manufacturers, to reduce the standard to 10 parts per million. Concerning tests and methods of estimation, a number have been proposed. The following modification of a process proposed by R. Warington in 1898, has given good results in the author's hands, and is therefore proposed for the estimation of lead in citric and tartaric acids and cream of tartar: Ten grams are dissolved in 15 Cc. of distilled water, 25 Cc. of solution of ammonia (10 per cent.) added, and made up to 50 Cc. One drop of solution of sodium sulphide (10 per cent.) is added, and the coloration produced is matched in Nessler glasses by adding from a burette a standard solution of lead acetate (containing 0.0001 gram of lead in 1 Cc.) to 50 Cc. of distilled water containing a drop of sodium sulphide solution. Each tenth part of 1 Cc. will then represent 1 part of lead per million.—Chem. & Drugg., April 16, 1904, 633.

In a second paper, referring to the coloration produced, the author observes that there appears to be some little difficulty in exactly matching the tint produced in some samples, owing to a difference in the quality of the color. The author explains that in cases where an indication of more than 20 parts per million is obtained to dilute the solution accordingly, as is sometimes necessary in Nesslerising water. This should have been stated in the previous paper.—*Ibid.*, May 21, 1904, 815.

Tartaric Acid—New Method of Estimation.—Dr. Herm. Ley recommends the following new method for the estimation of tartaric acid, for which he claims both accuracy and convenience: The acid or bitartrate

(0.5 Gm. ? Rep.) is dissolved in as little water as possible, by the aid of heat, a 5 per cent. solution of zinc acetate is added, and the mixture is heated until a voluminous precipitate of zinc tartrate results. A large excess of alcohol (100–150 Cc.) is then added, followed by 5 Cc. of 50 per cent. acetic acid, the flask is covered with a watch-glass, and allowed to stand 10 minutes in the water-bath, then cooled. The precipitate is collected on a quantitative suction filter and washed with alcohol until a drop of the washings no longer yields a residue on evaporation. It is dried, heated to redness in a platinum crucible, allowed to cool, moistened with a few drops of nitric acid in order to re-oxidize any metal that may have been reduced, again heated to redness, cooled, and weighed. The method, as will be noted, depends on the formation of zinc tartrate, which is absolutely insoluble in alcohol, and the estimation of the tartaric acid (or bitartrate) on the basis of the zinc oxide formed on calcination. The acetic acid is used to decompose any calcium salt present in the sample, the calcium acetate being washed away by the alcohol.—*Pharm. Ztg.*, 49, No. 14 (Febr. 17, 1904), 149.

Tartaric Acid—Detection.—D. Ganassini detects the presence of free tartaric acid by heating its solution to boiling with a little red lead. After decanting and filtering, an equal volume of 1 : 5 solution of potassium sulphocyanide is added. In the presence of free tartaric acid the mixture blackens in a very few seconds; other organic acids do not give the reaction. The presence of mineral acids must be avoided. *Pharm. Journ.*, Jan. 16, 1904, 52; from *Boll. Chim. Farm.*

Cream of Tartar—Commercial Quality.—Chauncy N. Johnson, in an examination of twenty-one samples of cream of tartar, obtained from drug stores and grocery stores in Western Pennsylvania, West Virginia, New Jersey, and two samples from drug stores in London, England, on applying tests for the presence of chlorides, sulphates, phosphates, copper, lead, iron, calcium and ammonium salts and starch, found only one sample to be adulterated; in fact, it could hardly be called an adulterated article, for it consisted of starch, calcium sulphate and calcium superphosphate, without a trace of potassium bitartrate whatever. Fourteen samples assayed over 99 per cent. $\text{KHC}_4\text{H}_4\text{O}_6$ (the U. S. P. requirement), and of the remaining eight the poorest assayed 97.29 per cent.—*Alumni Report*, Nov., 1903, 142.

Bismuth Salicylate—Improved Test for Free Salicylic Acid.—In view of the unreliability of the official (B. P.) test for the presence of free salicylic acid in bismuth salicylate, Wm. Lyon has made some experiments with the object of its improvement. The main objection to the official tests is the fact that the alcohol directed for the solution of the free acid exerts a decomposing action on the bismuth salicylate, and that free acid may thus be indicated even when not present. What is wanted is a substance which will readily dissolve the free salicylic acid without causing decomposition

of the bismuth salicylate. Of all the substances tried, benzol (90 per cent.) appears to fulfil most satisfactorily the conditions. The test, which is easily applied, is carried out in the following manner: In a test-glass, or a graduated measure, containing a little of the test solution, a small glass funnel with a fairly thick filter-paper is placed. A small quantity of the sample to be tested is put on the filter-paper, and some benzol poured upon it. When the solvent percolates through the paper, it, being immiscible with water, forms a layer upon the surface of the test solution, and if free salicylic acid be present in the sample, a violet ring appears where the liquids are in contact. The official test solution of ferric chloride may be used, but it is preferable to use a much weaker solution, since the nearer it is to being colorless, the more markedly does the violet ring stand out in contrast. The filter-paper should be of a thick, close texture.—Pharm. Journ., Feb. 20, 1904, 219.

Borosalicic Acid—Preparation and Characters.—H. L. Troxel has prepared borosalicic acid as recommended in the National Dispensatory, by mixing a solution of 1 p. boric acid in 5 p. boiling water with a solution of two parts of salicylic acid in 10 parts of alcohol, concentrating the solution and allowing it to crystallize. It is thus obtained in small needles or a crystalline powder, having a bitter, not sour, taste, but an acid reaction to litmus. An odor of oil of wintergreen was also observed in the product.—Proc. Md. Pharm. Assoc., 1903, 23.

Salicyl-Sulphonic Acid. Value as Reagent for *Albumen* in Urine, which see under "Albuminoids."

Salol—Estimation in Mixtures with Phenacetin.—Frank O. Taylor suggests that the determination of the amount of salol in a mixture of salol and phenacetin may be accomplished by taking advantage of the great difference in their solubility in ether, salol requiring less than its weight of ether, while phenacetin is soluble only to the extent of 1.24 Gm. in 100 Cc. Weigh out 1.0 Gm. of the mixture and introduce it into a flask or cylinder, which is then tightly stoppered. Now add exactly 25 Cc. of phenacetin-saturated ether and let it stand with frequent shaking for one hour. Then carefully remove 10 Cc. by means of a pipette, evaporate to dryness in a tared capsule and weigh it. The difference between the weight of this residue and the weight of the phenacetin contained in 10 Cc. of the solution used, will be the weight of salol in the same amount. As this represents .04 Gm. of the mixture, multiply this result by 250 to obtain the percentage. The results are accurate within one per cent.—Bull. Pharm., May, 1904, 112.

Tannin—Color Reaction with Molybdic Acid.—Pozzi-Escot finds that a solution of molybdic acid or of a molybdate furnishes a very sensitive reagent for tannin, giving, even in very dilute (1:10,000) solution, a fine orange-yellow color with a few drops of a solution of tannin; the reaction is quite evident with a solution containing 1:100,000 of molybdic acid;

after concentration, 1 : 1,000,000 may be readily detected. The author has failed to get a similar reaction with other phenolic bodies, except gallic and pyrogallic acids, which give a similar color. The color is not modified by boiling. Most tannin-containing extracts give the reaction, with the exception of logwood, which gives a brown precipitate. The reaction only occurs in neutral solutions, since any free acid interferes with, and in very dilute solutions prevents, the formation of the color. The presence of iron does not interfere with the reaction unless the tannin be in excess. If a drop of the black emulsion be then placed on a piece of white filter paper, as the black iron tannate is deposited, the edges of the drop acquire a yellow tint, due to the tannin molybdate reaction.—Pharm. Journ., April 23, 1904, 548; from Ann. de Chim. Analyt., 9, 90.

Bismuthotannins—Preparation.—P. Thibault finds that tannin does not react on bismuth oxide, but only on the hydroxide. The compound $C_{14}H_{10}O_8Bi \cdot 9H_2O$ is prepared by allowing the theoretical quantities of bismuth hydroxide and tannin solution to remain in contact twenty-four hours, and washing and drying the solid product. The whole of the tannin is absorbed by the hydroxide, and the product is completely soluble in sodium hydroxide solution or mineral acids. If tannin or digallic acid be used in excess, the bismuthotannin formed fixes additional tannin in proportions equivalent to from $\frac{1}{4}$ to $\frac{1}{2}$ $C_{14}H_{10}O_8$ for each molecule of the compound $C_{14}H_{10}O_8Bi$. The bismuth in this compound substitutes some of the phenolic hydrogen, leaving the acid function free. Heretofore Cap first prepared a bismuth compound of tannin by triturating tannin with bismuth hydroxide, while Sieker, later, prepared the same substance by treating crystallized bismuth nitrate with a concentrated solution of tannin.—Pharm. Journ., Oct. 10, 1903, 517; from Bull. Soc. Chim., through Journ. Soc. Chem. Ind., 22, 961.

Viridinic Acid—An Oxidation Product of Caffeo-tannic Acid.—A. Nestler communicates the results of some studies on viridinic acid, an oxidation product of caffeo-tannic acid, which gives characteristic color reactions if the raw coffee is treated as follows: Three Gm. of the coffee, cut up, is boiled for fifteen minutes in 100 Cc. of water, the solution is filtered, and made up to 100 Cc. Of this filtrate, portions of 5 Cc. are placed into small capsules and each treated with 3 Cc. of the following reagents, the capsules remaining uncovered at the ordinary room-temperature. Solution of *ammonia* produces an immediate green color with a shade of yellow, but soon becomes pure green and finally dark green. Solution of *sodium carbonate*: at first yellowish-green, then brownish-yellow, and after several hours a coffee-brown color, if a 25 per cent. solution is employed, but if a solution containing only from 0.5 to 5 per cent. of sodium carbonate is employed, a handsome green color is developed in a few minutes. *Caustic potassa*, in 5 per cent. solution, produces a yellow color, changing to brown, while in 0.5 to 1 per cent. solutions, the color

at first is greenish-yellow and then becomes green. The addition of *albumen* results in the formation of an immediate yellowish-green, changing afterwards to a handsome emerald green. Maté gives the same reaction, but the green soon changes to brownish-green. If a drop of strong hydrochloric acid be applied to a section of raw coffee bean, the cell contents will be seen to be colored blue when examined under the microscope in half to three-quarters of an hour. The addition of glycerin to the section changes the color from bluish-green to greyish-green, and green.—Pharm. Centralh., 45, No. 13 (March 31, 1904), 242; from Ztschr. f. Unters. d. Nahr. u. Genussm., 1903, 1032.

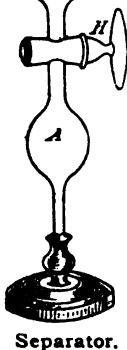
Picric Acid—Solubility in Ether.—J. Bougault finds the statement in works of reference, that picric acid is more soluble in ether than in water, to be incorrect. The solubility in anhydrous ether, sp. gr. 0.721, does not exceed 1.08 in 100 volumes at 13° C., whereas its solubility in water is 1.2 : 100. The solubility greatly increases, however, with the hydration of the ether; when that solvent has the sp. gr. 0.725, 100 volumes dissolve 3.68 parts of picric acid, and at the sp. gr. 0.726, 4.0 parts. It is curious that the solution in anhydrous ether is colorless, while that in ordinary ether is of an intense yellow color. From this it follows that picric acid affords a ready and convenient test for the freedom of ether from water. If the acid imparts no color, the ether is anhydrous, and from the depth of color obtained with ether containing water an approximate idea of the degree of hydration may be obtained. This reaches its maximum with ether of the sp. gr. 0.725.—Pharm. Journ., Oct. 17, 1903, 549; from Journ. Pharm. Chim. [6], 18, 116.

ORGANIC BASES.

Alkaloidal Assay—Improved General Method.—A. B. Lyons observes that although Keller's general method for the assay of alkaloidal drugs has been widely accepted as the most practical yet proposed, there are some theoretical objections to the method. The most serious of these depends upon the solubility of ether in water, and conversely that of water in ether. Another source of error, in the aliquot part, is found in the volatile nature of the solvents used. In warm weather it is impossible to avoid some loss by evaporation, so that the aliquot part taken is too large. Dr. Lyons has now devised a modification of the Keller method, which seems to him less open to objections than any heretofore proposed. The plan, he states, is the very obvious one of packing the drug in the percolator, having previously moistened it with an appropriate menstruum of which an alkali forms a part, the method being carried out as follows: Provide a cylindrical percolator about 20 Cm. in length and 1 to 2.5 Cm. in internal diameter; ending in a tube 5 Cm. long and about 3 Mm. in internal diameter. A glass stop-cock in the tube would be a very desirable improvement. In absence of this, the rate of flow of the percolate must be controlled by packing the tube more or less firmly with absorbent cotton. Since the sol-

vent is to be a very mobile fluid, the packing should generally be quite firm. Having prepared the percolator, moisten the drug (5, 10, 15, 20 Gm. or more, according to richness in alkaloid—the finer the powder the better) with the mixture of ammonia, alcohol and ether-chloroform, the proportions of which will be somewhat varied to suit different drugs. If 10 Gm. of such a drug as belladonna leaf is to be used for the assay, the mixture may consist of: Stronger solution of ammonia, 1 Cc.; alcohol, 4 Cc.; ether-chloroform (6:1 vol.), 5 Cc. Moisten in a small evaporating dish, transfer quickly to the percolator, pressing the powder down firmly with a glass rod. The small amount of powder that remains adhering to the dish, spatula and glass rod can be easily transferred to the percolator by aid of a little absorbent cotton, which is finally pressed down upon the powder. The percolator is then to be covered and allowed to stand five to ten minutes so that the ammonia may thoroughly permeate the drug. A mixture of ether and chloroform, or whatever solvent is best suited to the extraction of the alkaloid present, is next added, and the powder percolated with it to exhaustion. It is generally easy to secure a rate of flow of one drop per second, which will ensure thorough exhaustion by the time that 50 to 75 Cc. of percolate has passed. When it is believed that the exhaustion is complete, test this by collecting 15 or 20 drops, stirring this with a drop of normal sulphuric acid, evaporating off the ethereal solvent and testing the acid solution with Mayer's or Wagner's reagent. From this point the assay is to be carried on in the usual manner.—Pharm. Rev., 21, No. 11 (Nov., 1903), 428-430.

Alkaloidal Assay of Simple Drugs—Various Processes.—E. Léger describes a number of assay processes, adapted in each case to the drugs named, comprising nux vomica, ignatius bean, ipecacuanha, and cinchona, which cannot be profitably condensed, and must, therefore, be consulted in the original text as given in Pharm. Journ., June 18, 1904, 827, 828; Journ. Pharm. Chim. (6), 19, 479.



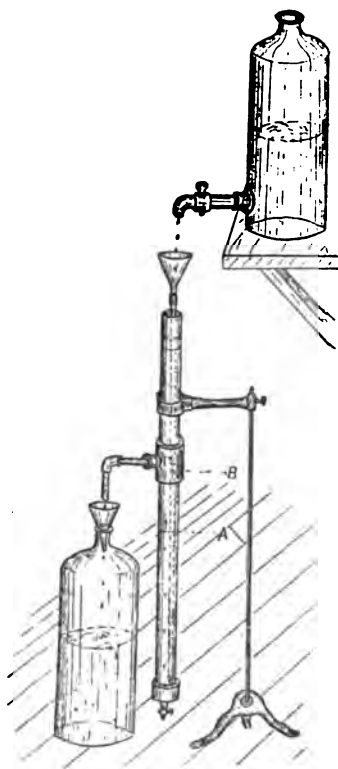
Alkaloidal Assay—Convenient Separator.—F. Sperling makes use of the little apparatus shown by Fig. 66 for the convenient separation of the ether in the shaking-out process of certain alkaloidal determinates, particularly by quinine in the tannate or the ferrous citrate. The stop-cock (*H*) being open, the alkaline alkaloidal solution and ether are poured into the apparatus through *B*, which is then securely stoppered, vigorously shaken several times, and allowed to stand. Under proper adjustment of the aqueous medium this will fill, or very nearly fill the lower bulb, *A*, and the stop-cock being closed after separation has been effected, the greater part of the ether solution can be poured off. The shaking out is repeated twice with ether, adding after the

last separation sufficient water to exactly fill *A* and to drive all the ether into *B*.—Pharm. Ztg., 48, No. 61 (Aug. 1, 1903), 615; from Ztschr. Oest. Apoth. Ver., 1903, No. 29.

Alkaloid Separator—A Simple and Convenient Device.—Burt E. Nelson describes the simple device shown by the accompanying sketch (Fig. 67) which has been in successful use in the laboratory of the Binghamton (N. Y.) State Hospital for some time in separating the total alkaloids from hyoscyamus. The principle governing its action is that of the ordinary Hulsebosch "perforator." It consists of a 2-inch,

FIG. 67.

copper or iron, pipe provided with a screw cap and stop-cock below, and a T and elbow exit tube a little over half way up. A $\frac{1}{4}$ -inch pipe having a funnel attached to its upper end extends to the bottom of the larger pipe, being loosely held in place by a perforated and notched cork. In use the apparatus is filled with chloroform up to the point *A*, and the alkaline liquid from which the alkaloids are to be washed allowed to flow from the tubulated 5-gallon bottle above into the funnel tube in a rapid stream of separate drops, the rate of flow being regulated by the faucet in the tubulature. When this has reached the height of the point *B* in the inner tube it has forced out all the chloroform and begins to flow out of the lower end and up through the chloroform in the larger pipe at the same rate at which it enters above. As the aqueous alkaline liquid accumulates above the chloroform it gradually flows out and is retained in a suitable container until all the aqueous extract has been added from the jar. About 10 Cc. are now removed and tested for alkaloids with Mayer's reagent, when if appreciable amounts are present, as they usually are, the whole is again transferred to the upper jar and allowed to flow through a smaller fresh lot of chloroform. This is repeated until the extracted liquid contains only mere traces of alkaloid. When the chloroformic solutions containing the free alkaloids are drawn off below care must be used to completely separate them from the smaller portion of watery extract which could not run out of the exit tube. When once set going properly the process is as nearly automatic as is that of percolation.



Separator.

—Amer. Drugg., 43, No. 1 (July 13, 1903), 3, 4; from Proc. N. Y. State Pharm. Assoc., 1903.

Alkaloids—Identification by Means of the Polariscopes.—P. Kley has devised a rapid method, by means of which, with the aid of the polarizing microscope, he claims that the different alkaloids can be identified by their refractive indices. A very small crystal, which acts to some extent as a convex lens, is placed on the object-glass of the microscope, together with a liquid of known refracting power. In making the examination, parallel light is used; on adjusting the microscope, one can recognize by certain phenomena whether the liquid is more or less refracting than the crystals. The liquid is then replaced by another and so on, until, when the refractive indices of the crystals and of the liquid are identical, the contour of the crystal can no longer be perceived, but only colored rings. In this manner definite values can be obtained for the various alkaloids, without determining the crystalline form, angles of the two optical axes, etc. The author examined in the above manner the alkaloids of nuxvomica, of opium, and of cinchona bark; also cocaine, atropine, hyoscyamine, hydrastine, berberine, cytisine, physostigmine, sparteine sulphate, aconitine, delphinine, veratrine, cantharidin, piperin, caffeine, and theobromine. By setting out the results graphically, a right-angled field is obtained, in which the different substances are represented by points; the diagonal separates the positive and negative crystals, and the distance from it indicates the intensity of the double refraction. The points representing different alkaloids coincide only in a few cases, and then only when the alkaloids in question can be easily distinguished by other means. On the other hand, alkaloids which can only be distinguished with difficulty by other means (*e. g.*, strychnine and brucine), are represented by points widely removed one from the other.—Pharm. Journ., March 26, 1904, 428; from Rec. trav. Chim. Pays. Bas., 22, 367.

Alkaloids—Characteristic Reactions with Bromine Water.—As intimated in his paper on the toxicological examination of Cocaine (which see), by means of bromine, H. Siemssen has found that several other alkaloids will give characteristic reaction with bromine water saturated at 20° C., as follows:

Atropine (sulphate) produces at first a yellow precipitation, which disappears on prolonged standing.

Apomorphine (muriate) produces a dirty orange-yellow, and the segment of intestine acquires a brown color.

Arbutin produces by prolonged action (2 days) a light-blue, fluorescent, very finely-divided precipitate.

Brucine produces a rose-red precipitate after prolonged standing, the intestinal segment remaining colorless.

Cocaine produces the immediate voluminous light-yellow precipitate,

insoluble in the precipitant, as described in the author's previous paper cited.

Morphine (muriate) produces no precipitate. The liquid remains colorless, but the segment of intestine becomes yellowish.

Strychnine (nitrate) produces a chocolate-brown precipitate, which does not disappear on prolonged standing.

Hyoscine, *Hyoscyamine*, *Narceine* and *Veratrine* give no reactions worthy of note. All the reactions were carried out exactly as described in the original paper above referred to.—Pharm. Ztg., 49, No. 9 (Jan. 30, 1904), 92.

Alkaloids—Influence of Urea on their Products of Decomposition at High Temperatures.—G. Frerichs communicates the results of researches undertaken with the object of lowering the temperature of decomposition in the study of the constitution of alkaloids. Most alkaloids, containing oxygen, suffer by heating to a temperature of 200° C., many at even lower temperatures, a far-reaching decomposition, in which mostly dark-colored resinous masses are produced, from which the isolation of well-characterized compounds is possible only in rare cases. The volatile products, which are produced by heating the alkaloids, also, are mostly complicated mixtures of oily bodies. Thus, when

Narcotine is carefully subjected to dry distillation, a few drops of a faintly colored, oily distillate is obtained, which soon congeals to a crystalline mass. On crystallizing this mass from diluted alcohol, colorless crystals are obtained, melting at 100° C., which possess neither acid nor basic properties; but it is exceedingly difficult to obtain this body by the method of dry distillation in sufficient quantities for examination. Somewhat better results are obtained when narcotine is subjected to dry distillation in the presence of certain indifferent bodies, such as diphenylamine or high-boiling paraffin, which lower the temperature of decomposition; but here also the yield is quite small, and considerable quantities of the indifferent bodies pass over with the decomposition product and are difficultly removed from the new body. The author, however, finds that the decomposition of narcotine into simpler bodies at moderated temperature is quite possible, without distillation, if the alkaloid is simply melted with the double or three-fold quantity of urea. The urea, which melts at 130° C., is likewise decomposed at a lively rate at the higher temperatures necessary, but its products of decomposition are easily separated from other bodies, while the products of decomposition of the urea, among which ammonia and cyanic acid are particularly to be mentioned, appear to have no influence upon the decomposition products of alkaloids except, possibly, in rare instances. By the intervention, then, of urea in the manner indicated, and by a process described in detail, the author has succeeded in splitting up narcotine with formation of *meconin*, and in estab-

lishing that narcotine is composed of an *opianic acid residue* and a *hydrocotarnin residue*, the splitting up into these two complexes being easily accomplished. If oxidizing agents are employed for splitting up the alkaloid, the products are *opianic acid* and *cotarnin*—the oxidation product of *hydrocotarnin*; if the splitting up is done by a reducing agent, *meconin*, the reduction product of opianic acid, and *hydrocotarnin* are formed. The author has, furthermore, found that

Hydrastine, the nearest related alkaloid to narcotine, gives very similar results when melted with urea. Meconin was also obtained in abundance, but the isolation of other well-characterized bodies was not successful. The authors also make the preliminary statement that

Narceine, *Papaverine* and *Berberine*, the next closely related alkaloids, show an entirely different behavior under the conditions in which narcotine and hydrastine were examined. These will be reported on later.—Arch. d. Pharm., 341, No. 4 (July 11, 1903), 259–270.

Alkaloids—Methyl Bromides and other Quaternary Substitution Compounds.—Although the pharmacological experiments of S. Fränkel with certain quaternary alkaloidal salts seemed to exclude such compounds from medicinal application, partly on account of increased potency (in the case of atropine derivatives) and partly because of a marked reduction of their activity (in the case of methylated strychnine salts), the utility of such substitution compounds has more recently been demonstrated in the case of

Atropine-Methyl-Nitrate and *Atropine-Methyl-Bromide*, both of which have been found quite effective. To these must now be added

Apomorphine-Methyl-Bromide, which has been prepared by Pschorr, and is now being subjected to comprehensive clinical examination. This compound has the formula $C_{18}H_{20}NO_2Br$. It crystallizes from methyl alcohol in colorless, brittle needles, from acetone in small scales or six-sided plates; melts at $180^\circ C.$; is very soluble in water, and its solution is considerably more permanent and resistant to the influence of light than the hydrochloride of apomorphine. For the alkylation of this and other quaternary substitution compounds the author uses the dimethyl- or diethylsulphate. The methyl- or ethylsulphates primarily produced are then converted into compounds of the desired acid by the use of saturated solution of salts of the required acid, and simultaneously salted out. In this way the author has prepared an entire series of salts, which may here be briefly described as follows:

Apomorphine-Methyl-Chloride, $C_{18}H_{20}NO_2Cl$, occurs in prisms melting, when anhydrous, at $205-210^\circ C.$ *Strychnine-methyl-bromide*, $C_{23}H_{23}N_2O_2Br + H_2O$, in glittering unstable crystals, soluble in about 20 parts of cold water. It parts with its water of crystallization at $125-130^\circ C.$ under 50 Mm. pressure, and melts at $254-256^\circ C.$ *Strychnine-ethyl-bromide*, $C_{23}H_{27}N_2O_2Br$, occurs in small cubes melting at $277-281^\circ C.$ *Strychnine-methyl-chloride*,

$C_{22}H_{28}N_2O_4Cl + 2H_2O$, in small scales, which frit at $265^\circ C.$, but do not melt at $300^\circ C.$ *Strychnine-methyl-sulphate* $(C_{22}H_{28}N_2O_4)_2SO_4$, glittering needles, which melt at $274^\circ C.$ *Strychnine-methyl-nitrate*, $C_{22}H_{28}N_2O_4NO_3$, in colorless columnar crystals, melting between $280-287^\circ C.$ *Brucine-methyl-bromide*, $C_{24}H_{32}N_2O_4Br + 3H_2O$, in leaflets, soluble in 10 parts of cold water; melts at $247-253^\circ C.$ *Brucine-ethyl-bromide*, $C_{24}H_{34}N_2O_4Br + 3\frac{1}{2}H_2O$, crystallizes from alcohol in scales, decomposing slowly between $217-235^\circ C.$ *Brucine-methyl-nitrate*, $C_{24}H_{32}N_2O_4NO_3 + 1\frac{1}{2}H_2O$, in needles, melting at $270-272^\circ C.$ *Quinine-methyl-bromide*, $C_{21}H_{27}N_2O_4Br + H_2O$, crystallizes from hot water in needles melting at $121-122^\circ C.$ Very soluble in alcohol, but only in 1:55 parts of cold water. *Quinine-methyl-chloride*, $C_{21}H_{27}N_2O_4Cl + \frac{1}{2}H_2O$, forms needles which melt at $190-191^\circ C.$ with decomposition; very soluble in water and in alcohol. *Quinine-methyl-sulphate* $(C_{21}H_{27}N_2O_4)_2SO_4 + 5H_2O$, crystallizes from hot water in needles which melt at $188-189^\circ C.$ Sparingly soluble in cold water, readily so in alcohol. *Quinine-methyl-nitrate*, $C_{21}H_{27}N_2O_4NO_3 + H_2O$, occurs in needles which melt between $91-92^\circ C.$ Readily soluble in water and in alcohol. *Quinine-dimethyl-bromide*, $C_{22}H_{30}N_2O_4Br + 4H_2O$, crystallizes from a mixture of alcohol and acetic ether in scales melting between $92-93^\circ C.$ It is readily soluble in water, and in ethyl and methyl alcohol, and loses its water of crystallization at 100° to $105^\circ C.$ —Pharm. Centralh., 45, No. 4 (Jan. 28, 1904), 59-60; from J. D. Riedel's Berichte, Jan., 1904.

Antipyrine-Calcium Phosphate—A New Double Salt.—Manseau states that when calcium biphosphate is added to a concentrated aqueous solution of antipyrine, the mixture assumes a brown color, but after a time becomes colorless, and deposits, when sufficiently concentrated, a white, crystalline double salt of the two components used. Collected and dried at a gentle heat, a white, crystalline powder is obtained, which is soluble in water, and gives all the reactions of antipyrine and calcium phosphate. Its composition is in accordance with the formula $(PO_4)_2H_4Ca.C_{11}H_{12}N_2O + 2H_2O$. By recrystallization this salt can be obtained in handsome rhomboidal crystals.—Pharm. Ztg., 49, No. 17 (Feb. 27, 1904), 177; from Rép. de Pharm., 1904, No. 2.

Arecoline Hydrochloride—Dangerous Adulteration.—Arecoline hydrochloride has the same therapeutic effect as pilocarpine hydrochloride, but in ten times less degree. In veterinary practice it is used as a purgative in doses of 3 gr. by subcutaneous injection. A preparation analyzed by Perrier, which caused the death of two horses, consisted of a mixture of two parts pilocarpine hydrochloride, and a very poisonous substance which showed the veratrine reaction.—Chem. & Drugg., Feb. 20, 1904, 310; from Bull. des Scienc. Pharmacol., 1903, ii, 167.

Betaine—Physiological Action.—From certain experiments made by

Schultzen (1870), it has hitherto been held that betaine, extracted from raw beet sugar, is not poisonous to rabbits, dogs and cats, even in large doses. Recent experiments made by Walker and Plummer, however, have shown that betaine from raw beet sugar has perfectly well marked, although not very powerful, poisonous action. The pure substance, as hydrochloride, and having the melting-point 238° to 239° C., proved fatal to rabbits and cats when given intravenously in a dose of 0.1 to 0.15 Gm. per kgm. of body weight. Fatal doses were found to paralyze the heart, while smaller doses caused a rapid fall of blood pressure.—Pharm. Journ., Oct. 10, 1903, 517; from Brit. M. J., 2224, 380.

Xanthine Bases—Quantitative Estimation in Cacao and Chocolate.—J. Fromme has subjected the methods of Mulder, Beckurts, Süss and the more recent ones of J. Dekker and of P. Wellmans, for the estimation of the xanthine bases (theobromine and caffeine), in cacao, etc., to critical and experimental examination, and considers Wellmans', under certain modifications, the best. This modification consists in boiling the cacao in water acidulated with sulphuric acid so as to convert the starch into sugar, and by taking an aliquot portion of the aqueous solution for the assay, thus avoiding the tedious washing of the powder, the process being carried out as follows: Six Gm. of the powdered cacao, or 12 Gm. of powdered chocolate are boiled for half an hour in a tared (1 liter) flask, provided with a reflux condenser; with a mixture of 197 Gm. of water and 3 Gm. of diluted sulphuric acid. A mixture of 8 Gm. of calcined magnesia and 400 Gm. of water is then added, and the boiling continued for one hour, the reflux condenser being retained during the operation also, and the mixture is allowed to settle. Then 500 Gm. corresponding to 5 Gm. of cacao (=10 Gm. of chocolate), are filtered off and evaporated to dryness, or to the consistence of extract. The residue of evaporation is then triturated with a few drops of water, transferred with 10 Cc. of water into a separatory funnel and shaken out eight times with hot chloroform, using 50 Cc. each time. The chloroform is distilled off from portions of 100 Cc. of the united solution at a time, and the residue dried by constant weight. The bases may also be separated by the method of perforation, the extract being for this purpose dissolved in 25 Cc. of water instead of 10 Cc. Practically identical results appear to be obtained by either method.

The perforator used by the author for this purpose is shown by Fig. 68, and is used as follows: Having been joined to the flask *E*, which is placed on a water-bath, chloroform is poured into the tube *A* until it flows out by way of the bent tube *D* at *G* and accumulates in the flask to the amount of about 30 Cc. The extract solution is then carefully poured on top of the chloroform in *A*, and, the condenser *F* having been adjusted, heat is applied. The vapor of chloroform then produced reaches the condenser through *B* and *A*, and falls in drops into the aqueous solution of the extract, a corresponding quantity of the chloroform beneath the aqueous

H.L.E.

solution passing through *G* into the flask. From time to time samples of the chloroform in the lower part of *A* may be withdrawn by means of the cock *C*, which is provided with a capillary tube, for the purpose of examination; but this, in practice, is not necessary, the process of perforation being continued for six to ten hours, which secures the complete extraction of the alkaloids.—Apoth. Ztg., 18, No. 68 (Aug. 26, 1903), 593–596.

Caffeine and Theobromine—Isolation from Cocoa and Kola.—According to Dekker, the best method of determining the caffeine and theobromine in cocoa and in kola is to heat for an hour at the boiling-water temperature 10 Gm. of the fine powder with 5 Gm. of magnesia and 300 Cc. of water. The liquid is filtered, the marc is again boiled with 150 Cc. of water for fifteen minutes, and the filtrate added to the previous one. The water is evaporated, and the residue mixed with sand and extracted with 100 Cc. of boiling chloroform in three extractions. The weight of the chloroformic residue very accurately represents the alkaloids.—Chem. and Drugg., June 18, 1904, 988.

Citrated Caffeine—Dry Method of Preparation.—George F. Merson calls attention to the fact that the quantity of water directed in the B. P. to dissolve the citric acid in making citrated caffeine is unnecessarily large. In fact, the use of water is not necessary at all, for simple admixture of the alkaloid with the citric acid and sifting through a No. 40 sieve, drying on a “granulating tray” or on a water-bath, and again powdering and sifting, assures a product which is not only identical with that officially prepared, but superior in appearance.—Pharm. Journ., Jan. 2, 1904, 8.

Caffeine-Ethylene-Diamine—Process of Preparation.—It having been shown by E. Fischer that the chlorine alone in caffeine chloride is readily replaced by an amido-group, experiments have been made to substitute the amino-groups of ethylene-diamine, with the result of producing a new diuretic—“caffeine-ethylene-diamine.” Under a German patent equal parts of caffeine chloride and ethylene diamine are heated together in 10 per cent. solution for half an hour; the solution is filtered, evaporated to dryness, redissolved in water, rendered alkaline, and shaken out with chloroform. The chloroform yields the new compound on evaporation, which is then purified by crystallization from alcohol.—Pharm. Ztg., 48, No. 57 (July 18, 1903), 574.

Cinchona Alkaloids—Rapid Methods of Assay.—One of the serious faults in the process for the alkaloidal assay of cinchona adopted in the

FIG. 68.



Pharm. Germ. is due to the crystallization of the alkaloids from the extractive liquid occasioned by the length of time required in the shaking out of the powdered drug and the clarification of chloroform-ether solution—the results of analysis being, in consequence, uniformly too low. With the object of remedying this defect, G. Fromme has investigated the subject and recommends the following method, which permits the rapid assay of the bark, both by the volumetric and gravimetric methods:

2.5 Gm. fine or coarse powder, 2 Cc. ac. hydrochlor. pur. (25 per cent.) and 20 Cc. of water are heated in a 200-Cc. flask on a steam-bath 10 minutes. When cool, 50 Gm. of ether and 25 Gm. chloroform are added, the mixture is vigorously shaken, then supersaturated with 5 Cc. of 15 per cent. soda solution, and the mixture continuously shaken for 10 minutes. Next, 3 Gm. of powdered tragacanth are added, and the mixture is again vigorously shaken. From the now clear ether-chloroform mixture, 60 Gm. (corresponding to 2 Gm. of the powdered bark) are rapidly filtered off, evaporated to one-half and, after addition of 20 Gm. of ether, shaken out with 10 Cc. $\frac{N}{10}$ hydrochloric acid and twice with 10 Cc. of water—these liquids being united. The ether is then shaken out with 5 Cc. of $\frac{N}{10}$ hydrochloric acid, and a drop of this tested with Mayer's reagent to determine the presence or absence of alkaloid; if present, the ether is shaken out twice with 5 Cc. of water, and these washings and the acid liquid added to the liquids first obtained; if absent, these last shaking-out liquids are rejected. In either event, the excess of acid in the united liquids is determined by titration with $\frac{N}{10}$ alkali, and the cubic centimeters of acid are multiplied by $(0.0309 \times 50 =) 1.545$, which gives the percentage of alkaloid in the sample. If it is desired to make a gravimetric determination, the acid liquids and washings are rendered faintly alkaline with ammonia, the alkaloid rapidly and vigorously shaken out with 20, 10 and 10 Cc. of ether chloroform (2 + 1) and the united filtrates evaporated in a tared Erlenmyer flask, the residue redissolved several times in ether and the ether re-evaporated and finally dried to constant weight at not exceeding 100° C. The product, multiplied by 50, gives the percentage. Fromme bespeaks the gravimetric method as the most suitable for pharmaceutical purposes, because the indicator, hæmatoxylin, although the best available, is, nevertheless, not perfectly reliable.—Pharm. Ztg., 48, No. 74 (Sept. 16, 1903), 754.

Cinchona Alkaloids—Differentiation by Means of Disodium Phosphate.—According to J. Messner, the four cinchona alkaloids, cinchonine, cinchonidine, quinine and quinidine, may be differentiated by the behavior of their neutral salts (hydrochloride or sulphate) with a 5 per cent. solution of di-sodium phosphate. A 1 per cent. solution of the alkaloidal salt is prepared, to 10 Cc. of which three or four drops of the reagent are added. An immediate and permanent precipitate is given by *cinchonine*; no alteration is shown by *cinchonidine*; a turbidity ulti-

mately disappearing indicates *quinine* or *quinidine*. In the last case to another 90 Cc. of the 1 per cent. alkaloidal solution a few drops of hydrochloric acid, 25 per cent., are added. 10 Cc. of this acid solution gives with an equal volume of the sodium phosphate reagent a crystalline precipitate in the presence of *quinine*, but remains clear with *quinidine*.—Pharm. Zeit., 48, 455.

Quinine Sulphate.—*Test of the Dutch Pharm. for the Presence of Other Cinchona Alkaloids*.—The following test for the presence of allied alkaloids in quinine sulphate is official in the appendix to the Dutch Pharmacopœia: Seventy-five centigrammes of the thoroughly dry salt are dissolved in 40 Cc. of hot water, with the addition of a trace of sulphuric acid, so that red litmus-paper gives a bare indication of blue reaction. After the addition of 10 Cc. of a 10 per cent. solution of neutral potassium chromate and thorough cooling, the crystalline precipitate is filtered out through glass wool, and the filtrate treated with 10 drops of solution of caustic soda. After standing for twenty-four hours the liquid should remain perfectly clear, and show no signs of a flocculent precipitate.—Pharm. Post, 36, 583.

Tasteless Quinine Tannate.—*Formula of the Dutch Pharm.*—The following formula and process for preparing tasteless quinine tannate has been adopted, and is given in a supplement to the Dutch Pharmacopœia: Quinine sulphate, 7, is dissolved in alcohol, 95-96 per cent., 14, by warming on the water-bath. To the solution a similar alcoholic solution of anhydrous tannin, 24, is added, with stirring. The mixture is heated in a covered vessel until homogeneous, then poured into water, 200, with agitation, until the precipitate becomes pulverulent. It is then collected, pressed, and allowed to drain and dry at normal temperatures, being finally powdered and dried at a heat not exceeding 30° C. It should contain at least 9.5 per cent. of quinine.—Pharm. Post, 36 (1903), 583.

Crude Cocaine.—*Assay*.—Introducing a detailed description of experiments undertaken for the purpose of establishing a reliable assay method for crude cocaine, William Garsed mentions that four distinct alkaloids, namely cocaine, truxilline, cinnamyl-cocaine and tropa-cocaine, are known to exist in coca leaves, though all four may not be present in every sample. In the process of purification of the crude cocaine, a certain amount of uncrystallizable substance is always obtained, at one time called "amorphous cocaine," and from this the other alkaloids mentioned were subsequently isolated by various workers, "truxilline" having been originally called cocamine and isotropyl-cocaine by two of its investigators. Cocaine, truxilline and cinnamyl-cocaine are derivatives of ecgonine, which, when heated with strong acids or alkalies undergo hydrolysis and yield, besides ecgonine and methyl-alcohol, respectively benzoic, truxillic and cinnamic acids. Tropa-cocaine is not a derivative of ecgonine, but of pseudo-tropine, and yields on hydrolysis the latter substance and benzoic acid.

In a previous paper, in conjunction with Professor Collier (see Proceedings 1902, 1049), the behavior of pure cocaine hydrochloride towards a large number of reagents, was described. Subsequent experiments with the crude alkaloid pointed out the necessity of a systematic comparative study of the properties of the four alkaloids, pure samples of tropa-cocaine, cinnamyl-cocaine, truxilline and truxillic acid being secured for this purpose from the well-known house of E. Merck. As might be expected with substances so closely allied in constitution, they were found closely to resemble each other in chemical behavior; so much so, in fact, that no assay process, based directly on the properties of the alkaloids themselves, could be devised. Attention was then directed to the acid products of hydrolysis, namely, benzoic, cinnamic and truxillic acids, the idea being that if, after hydrolyzing the alkaloids, the respective proportions of each acid in a mixture of the three could be determined, then the respective percentages of the three alkaloids originally present could be calculated. The present paper is divided into two sections, each of which is subdivided in the following manner:

Section I. A direct comparison of the chemical and physical properties of cocaine, cinnamyl cocaine, truxilline, and tropa-cocaine. (a) Behavior towards reagents in aqueous solution. (b) Solubility in organic liquids. (c) Oxidation experiments with potassium permanganate.

Section II. A comparison of the chemical and physical properties of the hydrolytic products of the free alkaloids, namely: benzoic, cinnamic, and truxillic acids. (a) Oxidation experiments with potassium permanganate. (b) Experiments on the absorption of bromine. (c) Steam-distillation experiments. (d) Solubility experiments. (e) The assay of mixtures of the acids. (f) Experiments on the hydrolysis of the alkaloids. (g) Assay of the crude alkaloid obtained from different kinds of coca leaves.

It is impracticable to follow the details involved in these experiments, and it must suffice here to mention two distinct assay processes which can be devised on the basis of the experimental work described by the author:

Process No. 1. The crude alkaloid is weighed, dissolved in dilute sulphuric acid and subjected to the action of potassium permanganate. The unoxidized alkaloid is re-extracted and weighed; the loss in weight represents the amount of cinnamyl-cocaine present. The re-extracted alkaloid is then subjected to alkaline hydrolysis, and the truxillic and benzoic acids separated by taking advantage of the insolubility of the former in water. From the quantity found of each, the respective amounts of truxilline and cocaine originally present can be calculated. This process admits of the direct determination of the benzoic acid.

Process No. 2. The crude alkaloid is at once subjected to alkaline hydrolysis, the cinnamic acid determined by the bromination method, and the truxillic acid by taking advantage of its insolubility in water. The amount of truxilline and cinnamyl-cocaine present is then calculated, and

the difference between the combined weight and the weight of crude alkaloid originally taken represents the amount of cocaine present.

Each process was tried on two samples of crude alkaloid, extracted respectively from Truxillo and Java leaves. The results are given in the following table :

ALKALOID FROM TRUXILLO COCA.

Crude Alkaloid Taken.	Process No. 1.	Process No. 2.
	0.1540 Gm.	0.1232 Gm.
	Gm. Per cent.	Gm. Per cent.
Truxilline found	0.0280 = 18.2	0.0220 = 17.8
Cinnamyl-cocaine found.....	0.0356 = 23.1	0.0165 = 13.4
Cocaine found.....	0.0800 = 52.0	0.0847 = 68.8 (by difference)
Total found	0.1436 = 93.3	0.1232 = 100.0

ALKALOID FROM JAVA COCA.

Crude Alkaloid Taken.	Process No. 1.	Process No. 2.
	0.2010 Gm.	0.2108 Gm.
	Gm. Per cent.	
Truxilline found	0.0164 = 8.1	0.0197 = 9.3
Cinnamyl-cocaine found.....	0.1024 = 51.0	0.0801 = 38.0
Cocaine found.....	0.0740 = 37.0	0.1110 = 52.7 (by difference)
Total found	0.1928 = 96.1	0.2108 = 100.0

The processes appear equally good as far as the determination of truxilline is concerned ; process No. 2 has the disadvantage that the cocaine is estimated by difference ; in process No. 1 the cinnamyl-cocaine is estimated by difference, and comes out considerably higher than in process No. 2. This is what may be expected, as any impurities oxidizable by permanganate would be calculated as cinnamyl-cocaine. The sum of the percentage results in process No. 1 is over 90, and as it is certain that cocaine and truxilline are practically unaffected during the oxidation of the cinnamyl-cocaine, preference must be given to the permanganate process. In process No. 2, the fact that cinnamic acid readily absorbs bromine, while benzoic and truxillic acids, being saturated bodies, do not

absorb any bromine, is utilized for the direct estimation of the cinnamylcocaine.—*Pharm. Journ.*, Nov. 28, 1903, 784–791.

Cocaine—Characteristic Reaction with Sodium Molybdate.—H. Siemssen has observed that when an aqueous solution of a cocaine salt is treated with a concentrated hot solution of sodium molybdate, a white precipitate is produced which, when examined under a lens of 50 to 60 diameters, appears of a light green color. This apparent change in color is characteristic of cocaine, and is not exhibited by other alkaloids.—*Pharm. Ztg.*, 48, No. 53 (July 4, 1903), 534.

Cocaine—Toxicological Determination by Means of Bromine.—Siemssen, referring to the above reaction of cocaine with sodium molybdate, states that he has found it unsuitable for forensic examinations. He finds bromine water, however, to be admirably suited for its determination in toxicological cases, as shown by the following experiment: A segment of intestine was extracted with ether in a Soxhlet apparatus and then impregnated with 1 Cc. of a 0.01 per cent. solution of cocaine by setting it aside during two days. The segment was then repeatedly shaken with ether-alcohol and then transferred to a glass cylinder containing 2 Cc. of bromine water which had been saturated at 20° C. A light yellow voluminous precipitate resulted immediately, which proved to be insoluble in the precipitant. Atropine, brucine, morphine, strychnine and several other alkaloids, treated in the same way, afforded reactions which were in each case characteristic and could be distinguished from each other and from cocaine. The individual observations made will be the subject of a future paper.—*Ibid.*, No. 93 (Nov. 21, 1903), 941.

Cocaine—New and Characteristic Reactions.—C. Reichardt describes a number of new and characteristic reactions for cocaine. On the addition of a concentrated solution of *sodium nitroprusside*, drop by drop, to a moderately-concentrated cold solution of cocaine, an immediate turbidity is produced which, when examined under a lens of moderate power, is seen to be due to the formation of well-formed, reddish crystals. These consist of cocaine nitroprusside and may be produced in moderately dilute solutions of cocaine salts. If, in the same manner, a cold saturated solution of *uranium nitrate* is added to a tolerably strong cold solution of cocaine hydrochloride, an immediate yellow, crystalline precipitate is produced, the composition of which has not been determined, but which is possibly a double salt. It is also obtainable from fairly dilute solutions of the alkaloid. If a little perfectly pure *titanic acid* is dissolved in a few drops of concentrated sulphuric acid by the aid of heat and allowed to cool, the addition of a trace of cocaine hydrochloride to the cold solution is without effect upon it; but if the mixture is heated while stirring, so that oily drops are separated and are non-adherent to the sides of the porcelain container, the liquid gradually assumes a handsome violet to blue color. This reaction, which is quite characteristic, is due to a reduction

of the titanic acid. If a little *potassium ethyl-sulphate* is rubbed with a trace of cocaine hydrochloride and a few drops of concentrated sulphuric acid are added to the mixture, no reactions of any kind are manifested until, on applying heat, a distinct odor of peppermint is developed. This manifests itself even in presence of the smallest traces of cocaine. Finally, if a trace of cocaine hydrochloride is rubbed with *urea* and concentrated sulphuric acid is added, the mixture remains unchanged in the cold; but on heating it, a blue color, gradually increasing in intensity, is developed. —Pharm. Ztg., 49, No. 29 (April 9, 1904), 298; from Chem. Ztg., 1904, No. 24.

Cocaine and the Eucaines—Method of Distinction.—In the course of an examination of a 1 per cent. β -eucaine solution for the possible presence of α -eucaine or cocaine, Dr. G. Eigel made the observation that the reactions heretofore employed for distinguishing between the hydrochloride of these three bases gave different results if solutions of different strengths (0.1, 1.0 or 5.0 per cent.) were under examination. (1) He finds that if one drop of solution of ammonia is added to 10 Cc. of 0.1 per cent. solution of α -eucaine hydrochloride, a white precipitate is produced, while solutions of β -eucaine and cocaine hydrochloride solutions of the same strength are not so affected. (2) One drop of 1.0 per cent. α -eucaine solution mixed with one drop of solution of potassium iodide (1:10) produced in a few minutes large crystals of α -eucaine hydroiodide, while no crystals are produced under identical conditions with either cocaine or β -eucaine hydrochloride. (3) One drop of 1.0 per cent. solution of α -eucaine or of cocaine hydrochloride yields a white precipitate with one drop of solution of mercuric chloride (1:20); β -eucaine does not. (4) But all three salts produce a precipitate with the solution of mercuric chloride if they are in solution of 5 per cent. strength.

On these observations the author bases the following method of distinction: One drop of a 1 per cent. solution is mixed with solution of mercuric chloride (1:20). If precipitate results it is *α -eucaine or cocaine*; if no precipitate results it is *β -eucaine*. If now equal drops of this solution and of solution of potassium iodide (1:10) are mixed, the formation of crystals indicates *α -eucaine*, while if no crystals are formed, the solution contains *cocaine*.—Apoth. Ztg., Aug. 29, 1903, 603.

Colchicine—Method of Extraction.—H. Blau recommends the following method for the extraction of colchicine from the seeds as being easily carried out: Exhaust the entire seeds by boiling with 85 or 90 per cent. alcohol, distil the alcohol from the mixture and treat the residue with water. Allow this mixture to stand for several hours until the oil and resin have separated, then filter and shake out with chloroform. The chloroformic solution yields on evaporation crystals, the chloroform compound of colchicine, which can be decomposed by hot water, the chloroform dissipated, and pure colchicine obtained. The question whether the alkaloid is con-

tained in the seed-coats or the endosperm has not yet been definitely determined, for, whilst Hübler, Hertel, Kremel, and Zeisel regard the seed-coats as the seat of the colchicine, Geiger and Hesse, Laborde and Houdé, Eberbach, Stoeder and others are of the opposite opinion. Micro-chemical examination showed that it was contained in the inner layers of the seed-coat, and that the endosperm was devoid of alkaloid, and this result was confirmed by the very tedious method of filing off the seed-coats from a number of seeds, and examining these and the kernels separately. No colchicine could be detected in the kernels. The assay of the entire seeds indicated 0.379 per cent. of colchicine, whilst the seed-coats alone gave 0.377 per cent., calculated to the entire seed, thus showing, without doubt, that the colchicine is contained in the seed-coats. This and other experiments also showed that the colchicine can be entirely extracted by boiling the seeds for three or four hours with 85 per cent. alcohol on a water-bath, and the author thinks that this course should be adopted in the preparation of the tincture. The quantity of colchicine gradually diminishes when the seeds are kept, but old seeds still contain some. Fresh seeds should therefore be used for the galenical preparations. The gradual darkening of the color of the tincture is ascribed by the author to a gradual change of the colchicine with production of the dark-colored colchicoresin.—Pharm. Journ., Feb. 27, 1904, 246; from Zeits. d. Allgem. Oester. Ap. Ver., 41, 1067.

Corydalis Alkaloids—Researches on their Constitution.—Referring to his comprehensive communication on the corydalis alkaloids (see Proceedings, 1902, 1054), in which he had mentioned that Mr. Daniel Bruns was engaged, under his direction, in the further investigation of corybulbine and of the newly-discovered isocorybulbine, Prof. J. Gadamer now reviews some of the results that have been obtained, referring also to the work of Dobbie and Lander, which had proven the close relationship of corybulbine to corydaline, previously suspected by him. It seemed of interest to study the behavior of corybulbine on treatment analogous to that by which corydaline was converted into the optically inactive dehydrocorydaline. That corybulbine is convertible by oxidation with alcoholic iodine into a berberine-like dehydro-compound, had already been shown by Ziegenbein in 1896, and in the researches above referred to, the author had shown that by reduction this dehydro-compound is reconverted into an optically inactive base isomeric with corybulbine. Further researches have not led to any conclusive results regarding the formation of a second inactive compound, corresponding to *r*-corydaline; but a marked difference has been determined between the behavior of

Dehydrocorybulbine and Dehydrocorydaline.—While the last-named occurs, in conformity with its constitutional formula, as a pseud-ammonium base in keto-form and—just like berberine—can be separated from its sulphate by alkalies and shaken out by ether, dehydrocorybulbine occurs

as a true ammonium base. This distinction is referable to the action of the free phenol hydroxyl group in the dehydrocorybulbine, which with the ammonium hydroxyl group forms an inner salt—a phenolbetaine. The free (alkaloidal) dehydrobulbine is therefore soluble in water, crystallizes excellently from its aqueous solution, and is perfectly insoluble in chloroform, in ether, and in similar solvents. This also accounts for the inability of dehydrocorybulbine to yield like berberine or dehydrocorydaline a chloroform-, acetone-, etc., compound. This becomes possible only when the free hydroxyl group in dehydrobulbine has been removed, for example by benzoylizing. The benzoyl-dehydrocorybulbine then is capable of forming a chloroform- or acetone-compound which reacts also with yellow ammonium sulphide, forming a polysulphide. Regarding

Isocorybulbine, the pre-existence of which as a constituent of the corydalis tubers is undecided, this exhibits in all its relations such a close analogy to corybulbine, that its isomery can only depend on the relative position of the free hydroxyl group towards the methoxyl groups. This has been directly demonstrated in the investigations of Bruns, which follow this paper in exhaustive detail.—Arch. d. Pharm., 241, Nos. 8 and 9 (Nov. 21 and Dec. 15, 1903), 634–655.

Dionine—Value as an Ocular Analgesic.—Dr. J. Hinshelwood directs attention to the value of dionine as an analgesic for optical application. Although the drug has been long known, its value for this particular does not seem to be generally recognized. It is applied as a 5 per cent. solution, or, better still, as a 5 per cent. ointment with a vaseline basis, which is more readily diffused over the eye and not so soon washed out by tears where there is much lachrymation. Even a 2 per cent. solution may be used where pain is not very severe and lachrymation not acute. The analgesic action of the drug does not modify the sense of touch, and it is of no use as an anæsthetic, but it is most valuable in lessening pain due to various eye affections.—Pharm. Journ., May 28, 1904, 751; from Br. Med. Journ., 1904, I, 1000.

Hexamethylene tetramine (Urotropin)—Value as a Food-preservative.—The well-recognized value of hexamethylene tetramine, popularly known as urotropin and formin, as an internal disinfectant remedy in intestinal, bladder and blood affections, has pointed to its possible value as a harmless food-preservative. G. Marpmann has made experiments in this direction, and finds it to be a most efficient preservative for milk, chopped meat, etc., and superior to all others. It is used in the proportion of 0.1 per cent. for milk, which can then be kept fresh for several days, and even as little as 0.01 per cent. will serve to keep it fresh for twelve hours. Meat may be kept fresh with 0.01 to 0.02 per cent. These observations lead the author to suggest the following composition for a

Meat-preservative Salt: Hexamethylene tetramine, 100.0; common salt,

850.0; saltpetre, 15.0; sugar, 35.0 parts.—Pharm. Ztg., 48, No. 60 (July 29, 1903), 606.

Hydrazine Sulphate—Use in Analytical Oxidizing Reactions.—E. Orlof has devised a method for analysis by oxidation in alkaline solution, which is based upon the fact that sulphate of hydrazine, while exercising its oxidizing function in alkaline solution, gives off a volume of nitrogen equal to the volume of oxygen reacting. The oxidizing agent is first titrated with respect to the N given off with $\text{SO}_4\text{N}_2\text{H}_4\text{H}_2$. The substance is treated with the titrated solution of the oxidizer, and, when the reaction is terminated, $\text{SO}_4\text{N}_2\text{H}_4\text{H}_2$ is added; the number of Cc. of nitrogen given off represents the volume of oxygen not used in oxidizing the substance in question. The author has used this method in the following oxidizing reactions: 1. Oxidation by means of ferricyanide and KOH according to the equation $2\text{K}_3\text{FeCy}_6 + 2\text{KOH} = 2\text{K}_4\text{FeCy}_6 + \text{H}_2\text{O} + \text{O}$. 2. Oxidation by means of KMnO_4 in alkaline solution: $6\text{KMnO}_4 = 3\text{K}_2\text{O} + 2\text{Mn}_2\text{O}_4 + 13\text{O}$. 3. Oxidation by means of chloride of lime, and, in general, by means of chlorine, bromine, and iodine in alkaline solution.—Chem. News, Nov. 20, 1903, 257; from Journ. Soc. Phys. Chim. R., xxiv, 449.

Hydroxylamine—New Reaction.—L. J. Simon finds that when a dilute solution of any salt of hydroxylamine is treated with a few drops of a very dilute solution of sodium nitroprusside and a slight excess of alkali, and the mixture is boiled, the original yellow solution becomes at first orange-red, and finally of a deep cherry-red color; and on dilution a fine rose-red. During heating nitrogen and nitrous oxide are evolved. The reaction is very delicate. The color produced by a 1 : 1000 solution of hydroxylamine hydrochloride may be diluted again to 1 : 1000, and is still distinct. Oximes, both aldehydic and ketonic, do not afford the reaction, nor do the oximes of the various glucoses.—Pharm. Journ., Feb. 27, 1904, 247; from Compt. rend., 137, 986.

Hydroxylamine and Hydrazine—Use in Qualitative Analysis.—It is suggested by E. Kirvevenagel and E. Ebler that the salts of hydroxylamine or of hydrazine may be used with advantage for the separation of the metals precipitated by hydrogen sulphide. The principle of the method is as follows: The precipitated sulphides are well washed and dissolved in aqua regia, the excess of acid is evaporated off, and the residue taken up with water, and precipitated by a mixture of NaOH and a solution of sulphate of hydrazine or hydrochlorate of hydroxylamine; after boiling allow to cool, and filter. The precipitate (P_1) contains Hg, Cu, $\text{Cd}(\text{OH})_2$, $\text{Bi}(\text{OH})_3$, and traces of Ag; the filtrate (F_1) contains AsO_4Na_3 , SbO_4Na_3 , Na_2SbO_3 , $\text{Pb}(\text{ONa})_2$, and traces of bismuth. The precipitate (P_1) is dissolved in nitric acid, and the solution, on the addition of ammonia, throws down $\text{Bi}(\text{OH})_3$; the filtrate is treated with hydrochlorate of hydroxylamine, which precipitates the Hg; if copper is present the solution is decolorized

while maintaining the copper in solution; it is precipitated by means of sulphocyanide; nothing remains in solution but the cadmium which is precipitated by hydrogen sulphide. The filtrate (F_1) is saturated with H_2S , the lead separates out, there remain the tin, arsenic and antimony. On the addition of dilute sulphuric acid, the sulphides of these metals are deposited, and can be separated in the usual manner.—Chem. News, April 22, 1904, 203; from *Berichte*, xxxv., 3055.

Methyl Orange—Precautions in its Use as Indicator.—F. H. Alcock calls attention to the difficulties experienced by students in obtaining concordant results in titrations requiring the official methyl orange as indicator. He attributes this to the use of a greater quantity of the indicator than is necessary, which, in its undiluted state, is unnecessarily strong. In some cases, such as the examination of tap water, for instance, the official reagent, although containing but 0.2 per cent. of methyl orange, is with advantage used in quantities of 1 Cc. if diluted in the proportion of 1 Cc. to 99 Cc. of the official solvent. The official directions should specify the necessary dilution and the exact quantity of such dilution to be added in a given case.—Pharm. Journ., Aug. 29, 1903, 329.

Codeine Hydroiodide—Preparation.—Labadie-Lagrave and Rollin obtain codeine hydroiodide by heating the alkaloid with 2 equivalents of hydriodic acid, and crystallizing. It is obtained in form of yellowish crystals which require 60 parts of cold water for solution, but are soluble in 3 parts of boiling water, very readily in alcohol, but almost insoluble in ether.—Pharm. Ztg., 48, No. 60 (July 29, 1903), 604; from *Bull. Commerc.*, 1903, No. 6.

Morphine—Determination in Opium and the Tincture.—E. Dowzard observes that the B. P. method for the determination of morphine in opium is clumsy from an analytical point of view, and objectionable because of the difficulty of obtaining the required 104 Cc. of filtrate. He states that the following method is free from these objections and much less opium is required: 8 Gm. of the sample to be examined is transferred to a dry 200 Cc. conical flask, 100 Cc. of water added, and the flask closed with an india-rubber stopper, the flask is placed in water kept at about 80° to 90° C., shaking frequently, in the case of fine or coarse powder for about one hour, if in the raw state, until complete disintegration takes place. The flask is now cooled and 3 Gm. of slaked lime added, the rubber stopper is inserted, and the contents of the flask agitated frequently during the course of one to two hours (I believe in a longer maceration than is given in the B. P., especially for samples containing over 13 per cent. of morphine). The mixture is then filtered through a plaited filter and 51.6 Cc. of the filtrate (equal to 4 Gm. of opium) is transferred to a stout 200 Cc. conical flask, fitted with a sound cork; to this is added 5 Cc. of 90 per cent. alcohol, 30 Cc. of ether, and 2 Gm. of ammonium chloride; the cork is inserted and the flask shaken for thirty

minutes, either by hand or in a mechanical shaker. After standing for twelve hours, the flask is shaken for a few minutes, and the mixture filtered through a single filter paper. The ether should not be removed with a pipette from the flask, but the whole poured on the paper. The aqueous portion will run through, leaving the morphine attached to the filter, while the ether is left perfectly clear, and may be completely removed with a pipette. After the morphine has been transferred to the filter, the last traces may be removed from the sides of the flask with a rubber-tipped glass-rod; in this part of the process morphinated water is freely used for rinsing out the flask, and a small quantity of morphine is usually attached to the cork. This should, of course, be removed. The filter and its contents are washed with morphinated water until the filtrate is free from chlorine; then one washing is given with distilled water, using about 10 Cc.; the filter is allowed to drain and about 15 Cc. of ether poured over the edges of filter. After standing for a few minutes the ether may be removed with a pipette. The filter and its contents are now allowed to stand for about half an hour exposed to the air, and then transferred to a thick-walled beaker, 20 Cc. of $\frac{N}{10}$ H_2SO_4 is added, and the paper rubbed to a pulp with a glass rod. The liquid may be gently heated to ensure complete solution of the morphine; after cooling, the liquid is titrated with $\frac{N}{10}$ $NaHO$, using methyl orange as an indicator. Each Cc. of $\frac{N}{10}$ H_2SO_4 is equal to 0.0283 Gm. anhydrous morphine, 0.05 Gm. being added to the weight of morphine found as directed in the B. P. (equals average loss of morphine per 50 Cc.).

The B. P. method for determining the morphine in the tincture is also open to several objections which are eliminated in the following: 100 Cc. of the tincture is evaporated in a porcelain dish on a water-bath until the volume is reduced to about 30 Cc.; the residual liquid is cooled, and 3 Gm. of slaked lime added; the mixture is then worked into a smooth state with a small glass pestle, and transferred to a 100 Cc. measuring flask. Any traces of the matter left in the dish may be removed with a rubber-tipped glass rod. The mixture is then made up to 100 Cc. at the same temperature the tincture was measured at; if there is any froth, it may be removed by adding one or two drops of ether; 2.0 Cc. of water is then added, and the mixture allowed to stand for one hour, agitating frequently. The mixture is filtered, and 50 Cc. of the filtrate (= 50 Cc. of tincture) operated on as described under opium.—Pharm. Journ., Dec. 19, 1903, 909.

Narcotine—Color Reaction with Saccharose and Sulphuric Acid.—A. Wangerin finds that the color reaction of bile with saccharose and sulphuric acid, discovered by M. Pettenkofer in 1844, and since found to be produced with numerous other substances, is also produced by narcotine. Nevertheless, if the test is carried out as here described, it is quite possible to differentiate narcotine from other alkaloids: "If 0.01 Gm. of narcotine,

20 drops of pure concentrated sulphuric acid and one or two drops of 1 per cent. solution of cane-sugar are heated for one minute on a boiling water-bath with constant stirring, the greenish-yellow solution at first produced passes through yellow, brown-yellow, brown and brown-violet into a beautiful intense pure blue-violet color." If the watch-glass, upon which the reaction is made, is placed upon a white surface, it will be noticed that the intensity of the coloration is somewhat increased, and that the blue-violet color remains unchanged for several hours, the liquid becoming discolored and depositing a more or less dirty-appearing amorphous precipitate.

Under the same conditions, apomorphine, atropine, brucine, quinine, codeine, caffeine, hydrastine, morphine, physostigmine, pilocarpine and strychnine, produce colorless or nearly colorless solutions; of these, on prolonged standing, morphine alone acquires a faint rose-red color. Coniine and nicotine produce faint yellow colors, narceine, a chestnut-brown, picrotoxin a salmon to faint rose color. Colchicine, digitalin and veratrine, no other reaction than is produced by sulphuric acid alone.—Pharm. Ztg., 48, No. 66 (Aug. 19, 1903), 667-668.

Nicotine—Synthesis—Amé Pictet has discovered a synthetic method of producing nicotine from nicotinic acid, based on the following reactions: Nicotinic acid is etherified, then transformed by means of ammonia into an amide, then treated with sodium hypobromite, when 3-aminopyridine is formed. The mucate of this base is next prepared and submitted to dry distillation. After a series of complicated reactions, a substance is obtained identical with inactive nicotine. In order to convert this inactive substance into the two optically active modifications, right-handed tartaric acid is employed.—Chem. News, Dec. 24, 1903, 317; from Compt. rend., 87 (1903), No. 21.

Nicotine—Determination in Solutions Containing also Ammonium Salts.—Waldbott recommends the following method for determining nicotine in tobacco solutions, or nicotine solutions containing ammonium salts. 10 Cc. of this solution are mixed in a wide, open vessel with 15 to 20 Gm. of sodium bicarbonate with a glass spatula, so as to obtain a plastic, but nearly dry mass. This is treated with 20 Cc. of chloroform, heated, and the clear chloroform transferred to a separator. The extraction is repeated until about 100 Cc. of chloroform extract has been obtained. The amount of nicotine is then titrated in the usual way with semi-normal acid and alkali, using copper sulphate solution as indicator. This gives a greenish precipitate with free nicotine. Excess of semi-normal acid is first run in, which is then titrated back until a faint cloud is produced, which indicates the end point of the reaction. The error due to the presence of ammonia liberated by the bicarbonate from extracts containing a great excess does not exceed 0.4 per cent., and in ordinary cases not more than 0.2 per cent.—Pharm. Centralh., 45, No. 11 (March 17, 1904), 192.

Phenolphthalein—Constitution.—A. G. Green and A. G. Perkin have found that a solution of phenolphthalein, decolorized by an excess of caustic alkali, can be entirely neutralized, without any return of the color taking place, by careful titration at a low temperature with dilute acetic acid. If, however, the colorless neutral solution is boiled the red color returns in its full intensity, whilst at the same time the solution becomes alkaline. If the solution is acidified and either left for some time or heated, a precipitation of free phenolphthalein occurs, which also dissolves in aqueous alkalis to a red solution. The point at which neutrality occurs in the titration with acetic acid corresponds with the presence in the colorless solution of the carbinolcarboxylic acid salt, $C_6H_4(CO_2M).C(OH)(C_6H_4.OH)_2$. These observations do not agree with the electrolytic dissociation hypothesis, but are simply explained by the quinonoid theory if the color changes are attributed to a variation of type from a quinonoid to a benzenoid form and *vice versa*, due to hydration and dehydration. A similar explanation is offered in the case of quinolphthalein, the behavior of which is found to be exactly similar to that of phenolphthalein.—Pharm. Journ., Mar. 19, 1904, 399; from Proc. Chem. Soc., 20, 50.

Pilocarpine—Color Reactions.—Barral calls attention to several characteristic color reactions of pilocarpine. He claims that the most characteristic is Wangerin's reaction, which depends on the fact that a violet-colored body, soluble in benzene, is obtained by adding to a solution of pilocarpine a few drops of potassium bichromate solution, and then a few drops of hydrogen peroxide solution. On warming a solution of the alkaloid with persulphate of sodium, the liquid is colored yellow, and a characteristic odor is developed. The vapor given off blackens nitrate of mercury and turns litmus blue. Formic aldehyde and sulphuric acid warmed with a solution of pilocarpine give a yellow color, changing to red, and finally to brown. Mandelin's reagent gives a golden-yellow color, changing to green, and then to a stable blue.—Chem. & Drugg., March 19, 1904, 460; from Journ. Pharm. Chim., 1904, 188.

Pyridine—Estimation as Chloraurate.—Maurice François having endeavored to estimate pyridine in aqueous solution by adding to the solution a measured excess of solution of iodine in potassium iodide, and titrating the iodine left in solutions after the deposition of pyridine periodide, found that the method was not very accurate because of the incomplete precipitation of the pyridine. He has, however, obtained very good results by estimating the pyridine in the state of the chloraurate, and gives the details of the process employed in this estimation in Compt. rend., 87 (1903), No. 5; Chem. News, Sept. 11, 1903, 137.

Ricinine—Re-investigation.—Although ricinine was discovered in castor-oil seeds by Turon in 1864, and has since been described by others, the results obtained have not been concordant. L. Philippe and

L. Maquerme have re-investigated the composition of this body. It was extracted with boiling water from castor-oil press cake, the water extract concentrated to a syrup which was extracted with alcohol, this solvent evaporated *in vacuo*, and the residue thus obtained extracted with boiling chloroform, from which the ricinine crystallizes out on evaporation. When purified by re-crystallization this has the formula $C_8H_8N_2O_2$. When saponified with caustic soda it gives methyl-alcohol; the alkaline liquid, treated with hydrochloric acid, yields an abundant precipitate of ricinic acid, $C_7H_8N_2O_2$. Heated in sealed tubes with hydrochloric acid to 150° C. it is decomposed, evolving carbonic acid gas, forming ammonium chloride and a complex chloride readily soluble in absolute alcohol. This new compound crystallizes readily from water in large transparent prisms of the formula $C_8H_7NO_2.HCl + 2H_2O$; it melts with loss of water at $65-70^\circ$ C. It effloresces in the air, and readily becomes anhydrous at 110° C., losing a trace of hydrochloric acid. In this state it melts at $155-150^\circ$ C. The base is readily liberated from this salt by ammonia. It crystallizes from water in colorless needles, having the constitution $C_8H_7NO_2$. It melts, in the hydrated state, at about 80° C., when dried, at $170-171^\circ$ C. This last base, which can only be modified by substitution, probably contains a closed chain, and since it gives a marked red-colored reaction with ferric chloride, is doubtless methyl dioxypyridine or methyl oxypyridone, $C_8H_4NO_2.CH_3$, while ricinine, judging from the reactions obtained, is probably the carboxyl derivative of an isocinomethyl pyridine.—Pharm. Journ., May 7, 1904, 618; from *Compt. rend.*, 138, 506.

Sparteine—Chemistry.—Moureu and Villier, in view of the contradicting statements which have been published about sparteine, have made a very full investigation to settle the disputed points once for all. Pure sparteine has the following physical characteristics:

Sp. gr.....	$d_4^{20} = 1.0340$
Sp. gr.....	$d_4^{20} = 1.0196$
Rotatory power.....	$[\alpha]_D^{20} = -16.42'$
Boiling-point.....	188° at 18.5 Mm.
Boiling-point.....	325° at 754 Mm.
Refractive index at 19°	1.5293

The original formula of Stenhouse, $C_{15}H_{26}N_2$, is amply confirmed. The alkaloid forms both neutral and acid salts and is a very powerful base indeed. The following are the compositions of some of its more important compounds:

Neutral sulphate, $C_{15}H_{26}N_2.H_2SO_4 + 5H_2O$.
 Chloroplatinate, $C_{15}H_{26}N_2.2HCl.PtCl_4 + 2H_2O$.
 Picrate, $C_{15}H_{26}N_2.2C_6H_3(OH_4)N_4O$.

Numerous experiments have proved that sparteine is a bi-tertiary amine, and that the methyl group is not attached to the nitrogen atom.

A number of reduction derivatives have also been prepared.—Chem. and Drugg., March 19, 1904, 460; from Bull. Soc. Chim., 1903, 1135.

Sparteine Sulphate—Composition and Determination.—C. Moureu and A. Villier find that sparteine sulphate has the constitution $C_{15}H_{26}N_2 \cdot SO_4H_2 \cdot 5H_2O$, although when dried *in vacuo* over sulphuric acid it loses only four molecules of water. Sparteine is monobasic towards phenolphthalein, so that the sulphate reacts towards that reagent as a monoacid salt. It is, therefore, possible to determine the amount of sparteine sulphate in aqueous solution by direct alkalimetric titration, using phenolphthalein as the indicator, 10 Cc. of $\frac{N}{10}$ NaOH solution being equivalent to 0.422 Gm., or $\frac{1}{1000}$ of a molecule of $C_{15}H_{26}N_2 \cdot SO_4H_2$.—Pharm. Journ., Jan. 23, 1904, 77; from Journ. Pharm. Chim. [6], 12, 545.

Strychnine—Quantitative Estimation in Presence of Quinine.—E. F. Harrison and D. Gair propose the following method applicable for the quantitative estimation of strychnine when associated with quinine in syrups and other pharmaceutical preparations, which is dependent on the different solubility of the tartrates of the two alkaloids in a solution of Rochelle salt. A solution of the alkaloids, containing 0.05 to 0.1 Gm. of strychnine in 60 Cc., is slightly acidulated with sulphuric acid; ammonia water is added as long as the precipitate produced by it redissolves, when the quinine will be in the state of acid sulphate; then 15 Gm. of powdered sodium-potassium tartrate is added gradually, with stirring, followed by more ammonia, until the mixture is only just acid to litmus. The mixture is now warmed on the water-bath for about 15 minutes, then allowed to cool for about two hours, the precipitated quinine tartrate filtered off by the aid of a filter-pump, and washed with a solution of 15 Gm. sodium-potassium tartrate in 45 Cc. of water, made just acid with sulphuric acid. The filtrate and washings contain all the strychnine and mere traces of quinine, the strychnine being separated by rendering them alkaline, shaking out with chloroform, evaporating the chloroform solution, washing the residual strychnine with 3 portions of 1 Cc. each of washed ether, to separate traces of quinine, and then drying to constant weight. The authors give the results of nine experiments made with strychnine and quinine bisulphate in proportions varying from 0.05 to 0.2 Gm. of the former to 1.0 to 2.0 Gm. of quinine or its bisulphate, which show the method to be practically absolutely accurate.—Trans. Brit. Pharm. Conf., 1903, 564-566.

Theophylline-Sodium and Theophylline-Sodium Salicylate—Therapeutic Advantages.—Minkowski has made clinical experiments with two new compounds of theophylline (theocin), the one theophylline sodium, the other theophylline-sodium salicylate. He finds that these compounds exert the same diuretic action as that previously determined for theophylline itself, without, however, giving rise to stomach inconveniences; nor was the administration of these salts—0.4 Gm. of the sodium or 0.5 Gm. of

the sodium salicylate—attended by any unpleasant secondary action in any case.—Wien. kl. Rdsch., 1904, No. 7.

Tetramethyl-p-Phenylendiamine Test Paper.—Use for Recognizing Pathological Oxidation Processes, etc.—C. Wurster uses paper saturated with a solution of tetramethyl-p-phenylendiamine, which becomes blue-violet in presence of oxidizing agents, for the recognition of processes of oxidation and reduction, and finds it particularly serviceable for the recognition of the oxidizing action of sweat, saliva, and many plant juices.—Chem. Ztg., 1903, 651.

Yohimbine—Color Reactions.—According to Meillère, the alkaloid yohimbine gives with cane-sugar, glucose or furfural, on addition of sulphuric acid, the same color reactions that are given by the biliary acids, Utz calls attention, however, to the fact that on heating saccharose, glucose or furfural with acids by themselves, red or violet colorations may be produced, and that sesame oil produces the reaction even without resorting to heat. This color reaction cannot, therefore, be regarded as being serviceable for the identification of yohimbine.—Apoth. Ztg., 18, No. 93 (Nov. 21, 1903), 816.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Arnisterin—A Crystalline Phytosterin from Arnica Flowers.—Klobb has succeeded in separating from arnica flowers a crystalline phytosterin, to which he gives the name arnisterin. Its composition corresponds to the formula $C_{28}H_{46}O_2$; it crystallizes readily from alcohol with one molecule of alcohol of crystallization. Klobb considers this substance to be the crystalline portion of the bitter arnicin of Walz and Lebourdais; he was unable to obtain the crystalline arnicin of Börner.—Pharm. Journ., May 14, 1904, 649; from Bull. des Sciences Pharm., 6, 196.

Cannabinol—Preparation.—Employing a modification of the method of Wood, Spirey and Easterfield for the isolation of the active constituent of *Cannabis Indica*, cannabinol, S. Fraenkel has obtained this body in what he believes to be a pure condition. The Indian hemp (hashish) is extracted by petroleum spirit, the petroleum spirit is distilled off, and the residue, after evaporation to dryness, subjected to fractional distillation under a pressure of 0.5 Mm. The fraction distilling between 210° and 240° C. contains the cannabinol, associated with a paraffin, which is separated by the addition of alcohol. The liquid is then again subjected to fractionation, and a fraction having a constant boiling-point of 215° C. is finally obtained. This is cannabinol, a pale-yellow syrupy liquid, which becomes discolored by exposure to air. It produces intoxication when administered to dogs by the mouth or in the form of smoke, but not when administered subcutaneously.—Arch. Exp. Pathol., 49, 266.

Capaloid—Constitution.—Léger having disputed the presence of a methoxyl group in capaloid, which Tschirch and Klaveness had shown to

be present in this variety of aloin, as it is in nataloin and uganda-aloin, K. G. v. Küylenstjerne prepared some capaloin by the method of Léger, and subjected it to analysis by Zeissl's method, in three samples, crystallized respectively from alcohol, methyl alcohol, ethyl alcohol and acetone. The analysis indicated the presence of 9.76 per cent., 9.38 per cent., and 9.44 per cent. of methoxyl, in the order mentioned, and proves that its presence is not attributable to the formation of a methyl-alcohol compound in the process of preparation. The author's analytical figures also correspond better with the formula $C_{16}H_{16}O_7$, than with the new one of Léger, $C_{21}H_{20}O_7$, which would require 7.40 per cent of methoxyl.—Arch. de Pharm., 241, No. 9 (Dec. 15, 1903), 689.

Cryogenine—Precipitation by Formalin.—G. Patein finds that if 1 Gm. of cryogenine is dissolved in the smallest quantity of 90 per cent. alcohol, it is quantitatively precipitated by the addition of 1 Cc. of formalin, diluted with water and two or three drops of hydrochloric acid. The precipitation is complete, and the method may be employed for the determination of cryogenine in aqueous solution. It is found, however, that, in the case of urine the results obtained are not wholly satisfactory. The composition of the precipitate, which is a white powder, practically insoluble in alcohol, ether, chloroform, and carbon disulphide, melting at about $205^{\circ}C$., is being investigated.—Pharm. Journ., Jan. 30, 1904, 117; from Journ. Pharm. Chim. [6], 18, 593.

Gynocardin—A New Cyanogenetic Glucoside.—F. B. Power and F. H. Gornall, in the course of their examination of chaulmoogra seeds (which see under "Materia Medica"), observed that when these were bruised and brought into water a strong odor of hydrogen cyanide was developed. This is due to the presence of a cyanogenetic glucoside, which the authors have isolated in a crystalline state, and designated gynocardin. It is very soluble in water, less freely in alcohol, and crystallizes from these solvents in colorless needles which melt at $161-162^{\circ}C$. with slight decomposition, and have $[\alpha]_D^{19} + 37.1^{\circ}$; it gave on analysis the following percentages: C = 48.0; H = 5.8; N = 4.3. Its constitution is being determined.—Pharm. Journ., June 18, 1904, 825; from Proc. Chem. Soc., 20, 137.

Phaseolunatin—A Cyanogenetic Glucoside from Phaseolus Lunatus.—W. R. Dunstan and F. H. Henry describe a cyanogenetic glucoside, phaseolunatin, having the composition $C_{10}H_{17}O_6N$, which they have isolated from the seeds of *Phaseolus lunatus*, collected in Mauritius. It crystallizes in colorless needles, soluble in water. When hydrolyzed by emulsin, or by boiling with dilute acids, it splits up into dextrose, acetone, and hydrocyanic acid, thus: $C_{10}H_{17}O_6N + H_2O = C_6H_{12}O_6 + (CH_3)_2CO + HCN$. When warmed with alkalis, it combines with two molecules of water, forming

Phaseolunatinic Acid ($C_{10}H_{18}O_8$) and ammonia, and this acid is, in turn,

converted by dilute acids, into dextrose and α -hydroxy-isobutylic acid, in conformity with the following equation: $C_{10}H_{18}O_8 + H_2O = C_6H_{12}O_6 + C_4H_8.OH.CO.OH$. Phaseolunatin is therefore a dextrose ether of acetone-cyanhydrin, and its constitution may be represented by the formula $(CH_3)_3C(CN)-O-C_6H_{11}O_5$. It therefore differs from amygdalin, dhurrin, and lotusin, the other known cyanogenetic glucosides, since it contains an aliphatic nucleus, whereas the others are aromatic compounds. Under cultivation, a white variety of *Phaseolus lunatus* is obtained, which contains no phaseolunatin, and therefore yields no prussic acid. In this the bean shows an analogy to the well-known sweet and bitter varieties of the almond. The amount of hydrocyanic acid obtained from the active beans was found to vary between 0.041 per cent. in light brown beans to 0.088 per cent. in a dark brown variety.—Chem. News, July 10, 1903, 15.

Ponticin—*A New Rheum-Glucoside*.—E. Gilson has isolated a new glucoside from two commercial sorts of rhubarb, known as Rheum rhaponticum and "Austrian rhubarb," respectively, to which he has given the name of ponticin. He regards these two sorts of rhubarb as being devised from the same plant, a hybrid of *Rheum rhaponticum* and *R. undulatum*, which is cultivated in Moravia; the rhizome and larger roots being marketed as "Austrian rhubarb," the smaller as Rheum rhaponticum. The new glucoside, which was not obtainable from either "English" or "Chinese rhubarb," was obtained by extraction with acetone. It crystallizes in white crystals, has the formula $C_{21}H_{34}O_9$, and is insoluble in water, ethyl- and methyl-alcohol, cold acetic acid, ether, chloroform and petroleum ether, but readily soluble in solutions of caustic alkalies. By the action of dilute sulphuric acid it is split into dextrose and

Pontigenin, $C_{15}H_{14}O_4$, which is crystallizable and sparingly soluble in water, readily soluble in methyl- and ethyl-alcohol, ether, acetone, acetic ether and glacial acetic acid. It is noteworthy that although ponticin is extracted from the drug by acetone, the *pure* crystalline substance is said to be insoluble in that solvent.—Apoth. Ztg., Aug. 29, 1903, 603; from Bull. d'Acad. roy. de Méd. de Belg., 1903, 156.

Rhamnosides—*Distinction from Glucosides*.—Introducing the experimental part of a paper on a number of hydrolizable proximate principles, Professor Ernst Schmidt explains that certain plant substances rich in carbon, which are capable of being split by hydrolysis into bodies having an inferior carbon content and into rhamnose (isodulcitol), $C_6H_{12}O_5 + H_2O$, are now classified under the name of *Rhamnosides*. The number of these bodies, which must be regarded as rhamnose-ethers, is quite small in comparison to the glucosidal bodies, which may be designated as glucose ethers. Examples of rhamnosides are quercitrin, yielding rhamnose and quercetin; bapticin from *Baptisia tinctoria*, yielding rhamnose and baptigenin; glycyphyllin, from *Smilax glycyphylla*, yielding rhamnose and phloretin; fustin, frangulin, datiscin, and others too numerous to mention.

Again, there is a class of bodies, closely related to the rhamnosides, which by hydrolysis yield both rhamnose and glucose. These are designated as

Rhamno-Glucosides, and embrace such bodies as hesperidin, isohesperidin and, more recently, also globulariacitrin. To these must now be added, according to the experimental results above mentioned, rutin, from *Ruta graveolens*, caper-rutin, from *Capparis spinosa* and sophorin, from *Sophora japonica*, while robinin, from *Robinia pseudacacia*, belongs to a third class, the

Rhamno-Galactosides, which yield rhamnose and galactose by hydrolysis, and to which belongs also xantho-rhamnin, which is found by C. & G. Tanret to yield both of these sugars. A fourth class, finally, may be designated as

Rhamno-Mannorides, to which strophanthin would belong, since it is split into strophanthidin, rhamnose, mannose and methyl-alcohol; but in neither of the last two cases does the rhamnose appear to be a primary product of the hydrolyzation.—Arch. d. Pharm., 242, No. 3 (April 8, 1904), 210–224.

Rhein—Preparation from Aloe-Emodin.—In a previous paper (see Proceedings, 1903, 972) O. A. Oesterle had expressed the presumption that by the oxidation of aloe-emodin under certain conditions a substance was produced which corresponds in its characters with the rhein naturally found in rhubarb. In continuation of his researches he has now obtained results which confirm him in the opinion that the two kinds of rhein are identical. For the preparation of the rhein, 3 Gm. of aloe-emodin (obtained from barbaloin by heating its alcoholic solution with diluted HCl) are dissolved in 140–150 Cc. of glacial acetic acid, 3 Gm. of chromic acid are added to the boiling solution, the mixture maintained gently boiling for an hour, and then poured into water acidulated with sulphuric acid. After washing by decantation, draining with the suction-pump, and drying, about 70 per cent. of an oxidation product is obtained, which is extracted in a Soxhlet apparatus with chloroform until the chloroform passes off a faint-yellow color only, and the residue is then crystallized from pyridin. About 9–10 per cent. of rhein is thus obtained, and the quantity can not be materially increased by increase in the oxidizing agent when directly applied or by prolonging the period of oxidation. On the other hand, the portion extracted by chloroform, amounting to about 60 per cent., when subjected to the action of chromic acid in the same way, will result in a considerably greater yield of rhein. In this direction the author is still experimenting. When purified by repeated crystallization from pyridin, and even after acetylation and reconversion, the rhein from aloe-emodin had the melting-point 314° C., which corresponds with that given by Tschirch and Henberger for rhein obtained from rhubarb. In its composition it corresponds with the formula given by Hesse — $C_{16}H_{14}O_6$.—Arch. d. Pharm., 241, No. 8 (Nov. 21, 1903), 604–607.

Rutin—Preparation from Ruta Graveolens, Characters and Constitution.—N. Waliaschko communicates the results of extensive experiments undertaken with the object of determining the chemical character and constitution of the rutin from *Ruta graveolens*. Preliminarily operating by the method of Zwenger and Dronke, it was found that the process could be simplified by the direct crystallization of the rutin from the aqueous decoctions of the herb, instead of resorting to acetic acid for its extraction. The yellow crystals thus obtained were contaminated with a greenish resinous body, which was removable by solution in water, clarification of the solution with egg albumen, and several recrystallizations from water. The resultant rutin was found to have nearly all the characters attributed to it by the authors mentioned. It forms a crystalline powder of a light sulphur-yellow color, consisting of fine, faintly silky-glistening needles, which are neutral in reaction, odorless and tasteless, almost insoluble in cold water (1 : 7800), but soluble in about 200 parts of boiling water. It is fairly soluble in cold alcohol, very readily in hot alcohol and in warm glacial acetic acid, but very difficultly soluble or insoluble in the other organic solvents, such as ether, petroleum ether, benzol and acetone. It has no sharply defined melting-point, beginning to conglomerate at 185° C. and forming a yellow viscous liquid at 188°–190° C. The author's inquiry into the chemical constitution of rutin, which is described in great detail, confirms that it is a rhamno-glucoside, splitting up by hydrolysis under the assimilation of water into quercetin, rhamnose and glucose, in conformity with the following equation: $C_{27}H_{30}O_{16} + 3H_2O = C_{15}H_{10}O_7 + C_6H_{12}O_6 + C_6H_{12}O_6$.—Arch. d. Pharm., 242, Nos. 3 and 4 (April 8 and May 9, 1904), 225–254.

Vanillin—Oxidation by Oxydases and by Acacia.—R. Lerat finds that the fresh aqueous macerations of the fungi *Russula delica* and *R. fetens* have a powerful oxidizing action on aqueous solutions of vanillin. When mixed in equal volumes with a 2 per cent. aqueous vanillin solution a turbidity is soon produced, which increases rapidly, until finally a precipitate is formed, leaving the supernatant liquid clear. This oxidation is greatly facilitated by passing a current of moist air through the mixture. On collecting the precipitate it was found to be insoluble in the usual organic solvents, but readily dissolved by weak alkalies. It was purified by precipitating it from this solution with a current of carbon dioxide, and was then identified as dehydro-divanillin, melting at 302–305° C., identical with that body as obtained by Tiemann by the action of ferric chloride solution on vanillin. Solutions of gum acacia were found to exercise a similar oxidizing action on vanillin solutions, but much more slowly than with *Russula* oxydase. On mixing a 20 per cent. mucilage of acacia with a 1 per cent. aqueous solution of vanillin the odor of the latter was found to have totally disappeared in twelve days, and the vanillin was entirely converted into dehydro-divanillin.—Pharm. Journ., April 23, 1904, 548; from Journ. Pharm. Chim. [6], 19, 10.

Vanillin—Colorimetric Estimation in Vanillas.—While working on the colorimetric estimation of dulcine, A. Moulin came across an intense coloration which was recognized as being due to the presence of vanillin. The vanillin was eliminated by means of an excess of sodium bisulphite, and an attempt made to apply the color reaction observed to the estimation of this substance, the principle of the method adopted being as follows: If vanillin, which contains the group $C_6H_5-O-CH_3$, is treated with fuming nitric acid, this group passes to the state of methyl picrate, the solution of which is characterized by the yellow tint of the picric compounds, and serves for the estimation of the vanillin by comparison with a titrated color scale.—Chem. News, Oct. 2, 1903, 172; from Compt. rend., 87 (1903), No. 7.

Strophanthins—Distinctive Designations According to Sources.—Prof. Thoms, in order to distinguish the strophanthin from *Strophanthus gratus* (which see under "Materia Medica"), from the strophanthins obtained from the seeds of other species, proposes the prefix of the first letter, "g," of the specific word "gratus," to the word "strophanthin." Thus

g-Strophanthin, would indicate *Strophanthus gratus* as the source of the seed from which the glucoside is prepared, and, similarly, the prefix of the letters "h," "k," and "e," would indicate "hispidus," "Kombé," and "Emini," as the specific names of the strophanthus seed from which the glucoside is derived.—Apoth. Ztg., 19, 31 (April 16, 1904), 262; from Ber. d. d. pharm. Ger., 1904, 104.

Urson—Colorimetric Distinction from Cholesterin.—According to Ginkle, urson (a resinous constituent of uva-ursi, Rep.) gives with Liebermann's reagent the same color reaction as cholesterin. Ed. Hirschsohn now calls attention to a distinctive reaction. If 10 drops of liquefied trichloroacetic acid (9 acid, 1 water) are added to 1 Mgm. of urson, solution is effected in a short time, which becomes only faintly yellow even after 48 hours; with cholesterin, treated in the same way, a light violet color, changing to deep red violet, is produced. If, however, the urson solution is heated to boiling, a splendid violet color is developed. The test is available even for mixtures of the two substances, cholesterin being readily removed by petroleum-ether, when the test may be applied on the residual urson with the result stated.—Pharm. Centralh., 44, No. 40 (Oct. 1, 1903), 673.

Yanгонin—A Crystalline Body from Kawa Root.—J. D. Riedel describes in his "Report for 1904" the second crystalline principle, yangonin, contained in the roots of *Piper methysticum*, along with methysticin, and gives the process for its preparation. Yangonin melts at $156^{\circ}C$, and probably has the composition represented by the formula $C_{22}H_{30}O_8$, while others have given to it the formula $C_{17}H_{17}O_8$.—Pharm. Ztg., 49, No. 3 (Jan. 9, 1904), 26.

COLORING MATTERS.

Vegetable Coloring Matter—Varieties in Color in Aqueous, Alcoholic, Acid and Alkaline Liquids.—In view of the increasing use of coloring agents for the purpose of producing attractive preparations and the paucity of reliable information concerning vegetable and other coloring matter in this connection, Professor Wilbur L. Scoville has made a comprehensive study of the subject, including the use of aniline dyes and mineral coloring matters. Owing to the poisonous nature of many of the aniline dyes, these should be avoided for coloring pharmaceutical preparations ; or, if desirable, they should be carefully selected from non-toxic dyes offered by responsible houses. For vegetable colors no such objections exist, and for the selection of such the following table, showing which colors will be produced in aqueous, alcoholic, acid, and alkaline fluids by vegetable coloring agents, will prove useful :

This table is practically self-explanatory. It is necessary only to say that the shades described are relative and not absolute, for the shade always depends on the strength of the solution.—*Bull. Pharm.*, July, 1903, 279, 280.

Annatto—Sharp Reaction.—L. Dokkum recommends a simple but sharp reaction for the presence of annatto which has the advantage over the usual (sulphuric acid) test, in that it is not interfered with by the presence of curcuma and other coloring matter used for butter and cheese colors. A dilute solution of the substance is superimposed on a layer of nitric acid. In the presence of annatto, an intensely blue color is developed at the point of contact of the two layers, afterwards pervading the acid and changing to green, while the solution of the coloring matter requires a brick-red turbidity.—*Pharm. Ztg.*, 49, No. 29 (April 9, 1904), 298; from *Pharm. Weekbl.*, 1904, No. 13.

Cheese and Butter Colors—Non-Poisonous Preparations.—The “*Farben Zeitung*” gives the following practical directions for making non-poisonous cheese and butter colors:

Cheese Color.—To make a satisfactory smooth yellow, boil 100 Gm. orlean and 75 Gm. potassium carbonate in one and a half to two liters of water. Set aside, let cool down and then filter. As a preservative add 15 to 18 Gm. boric acid. Another process is to digest from 10 to 12 days 200 Gm. of orlean with 200 Gm. of potassium carbonate and 100 Gm. turmeric in from one and a half to two liters of alcohol of 60 per cent., filter and preserve in well-stoppered bottles. To use, add to every 100 liters of milk used in cheese-making from one and a half to two small tablespoonfuls of color. This produces a natural and permanent yellow color in the finished cheese. Under the name of

Butter Powders there is largely used a coloring matter which consists of a mixture of 12–15 per cent. of sodium chloride, 2 per cent. turmeric, and from 83 to 87.5 per cent. of sodium bicarbonate. A similar mixture is on the market, which consists of 1500 parts of sodium bicarbonate, 8 parts of saffron surrogate, and 2 parts of salicylic acid. A liquid butter color on the market consists of a solution of 300 parts of turmeric and 200 parts of orlean in 1500 parts of olive oil. The orlean is smeared on a plate of glass or tin as thinly as possible, and allowed it to get perfectly dry. It is now rubbed up with a rubber as finely as possible, and mixed intimately with the turmeric. The mixture is then stirred with the oil, and the mixture placed in the water-bath and allowed to digest for several hours. When a homogeneous liquid mass is formed, remove from the bath and filter, while still hot, through a wide-meshed linen filter. When quite cold, fill the filtrate into bottles and preserve. From 50 to 60 drops of this color are sufficient to give three pounds of butter a beautiful golden color.—*Nat. Drugg.*, May, 1904, 13.

Orcin—Occurrence in the Free State in Certain Genera.—Up to the present it has been considered that free orcin occurs only in the genus *Pertusaria*, whilst in *Rocella* and *Dendrographa* it existed only in combination. Ronceray has been able to demonstrate that in the last two genera it also occurs in the free state, and is localized chiefly in the reproductive organs, the vegetative portion of the thallus being almost free from it. The reagent used was a mixture of sulphuric acid and vanillin carefully adjusted to give a fine red coloration with free orcin, but no coloration with combined orcin. Ronceray found the same conditions to obtain in other genera also (*Umbilicaria*, *Lecanora*).—Pharm. Journ., May 14, 1904, 649; from Bull. des Sciences Pharm., 6, 193.

ALBUMINOIDS.

(INCLUDING ANIMAL PRODUCTS.)

Albumen—Reaction with Iodoform.—In contradiction to the statements of Kobert and Altenburg, Schmidt finds that solutions of albumen are capable of decomposing iodoform. It is difficult, however, to show the presence of iodine in these solutions by means of starch, as for this purpose it is necessary to remove the albumen entirely without affecting the iodine compound in the solution. The basic properties of the albumen molecule are the cause of the decomposition of iodoform. If albumen, or its nearest derivatives, be treated with iodine in solution there is always formed a compound which reacts like iodic acid, thus showing the basicity of the albumen molecule. Iodine, in the nascent state, removes hydrogen from the albumen molecule. This gives rise to the development of hydriodic acid. Blood, pus and urine containing albumin show free iodine in the presence of iodoform in virtue of this decomposition.—Apoth. Ztg., Oct. 28, 1903, 756.

Albumen—Salicyl-Sulphonic Acid as a Reagent for its Detection in Urine.—Dr. C. Murray confirms the value of the reagent salicyl-sulphonic acid, as recommended by MacWilliam, for detecting the presence of albumen in urine. A few drops of a saturated solution of the acid are added to 20 or 30 minims of the urine in a small test-tube. If no precipitate occurs there is no proteid present. If there be a precipitate the tube is boiled to distinguish albumen, which does not clear upon heating, but becomes coagulated and flaky, while proteoses give a clear solution which becomes cloudy again as the fluid cools. In the absence of precipitate, therefore, it is not necessary to boil at all. There is no need for care as to the exact amount of reagent to be added, since a large excess does not affect the result. The reagent is stable, non-caustic, and does not stain, and in the crystalline form is readily portable. The crystals may be directly dropped into the urine in a small test-tube, and dissolved by heating over any flame. No substance met with in urine has been

found to give a precipitate, except those of the proteid class, and the reaction with these is very sensitive.—Pharm. Journ., May 21, 1904, 682; from Brit. Med. Journ., 1, 1904, 883.

Albuminoids—Approximate Estimation in Urine.—A. Jolles has devised a method for the approximate estimation of albuminoids in urine, which is based upon the fact that permanganate of potassium oxidizes albuminoids in slightly acid solution, and that the amount of nitrogen given off by hypobromite of soda in the neutralized liquor is nearly a constant fraction of the original albuminoid. The method is carried out as follows: Precipitate 25 or 50 Cc. of urine, at boiling temperature, by means of acetic acid in the presence of chloride of sodium. The precipitate being collected in a beaker with 300 to 400 Cc. of water, add 5 Cc. of sulphuric acid ($d = 1.4$), and boil while gradually adding permanganate up to 8 Gm. per liter, until the precipitate of peroxide is constant. Dissolve the latter in oxalic acid, and concentrate to 50 Cc. Neutralize when cold with soda, then set free the nitrogen in a ureometer. The weight of nitrogen, multiplied by 7.68, represents the weight of albuminoid. The error found by comparison with the gravimetric method is about 2.5 per cent. more or less.—Chem. News, Nov. 20, 1903, 257; from Zeitschr. Anal. Chem., xii., 589.

Blood—Simple Method of Determining Its Alkalinity.—Dr. Arthur Dare, in view of the pathological significance of the variations in the alkalinity of the blood from the normal standard, and the consequent importance of some simple method whereby the blood alkalinity may be speedily and accurately determined, has undertaken some studies and experiments which have resulted in the invention of an apparatus termed "hemo-alkalimeter." By the aid of this instrument, and under specific and detailed directions given, the alkalinity of the blood may be determined with convenience, celerity and accuracy. A description of the hemo-alkalimeter cannot be given here without going into greater detail than the limitations of this report justify, and must therefore be consulted in the original in Amer. Journ. Pharm., 75, No. 11 (Nov., 1903), 503-510.

Commenting on some unfavorable criticism on the hemo-alkalimeter devised by Dr. Arthur Dare, Joseph W. England concludes as follows: "The hemo-alkalimeter of Dr. Dare does not differentiate between the kinds and proportions of blood alkalies. It is not perfect, nor is perfection claimed for it; but its application is certainly a step forward toward greater accuracy, and an improvement over the older methods of direct titration with acid and chemical indicators," etc., etc.—*Ibid.*, 510-513.

Hæmoglobin—Determination in Commercial Products.—The number of commercial varieties of hæmoglobin and hæmatogen seem to call for the necessity of determining their hæmoglobin content. Its determination on the basis of the albumen content of the preparation, as suggested by manufacturers, must be discarded, for the addition of the cheap and in-

active serum-albumen is the principal impurity to be guarded against. A writer in "Pharm. Ztg." therefore recommends the following method for determining the actual hæmoglobin content: A weighed quantity of the preparation is dissolved in luke-warm water (the solution filtered, Rep.), and the hæmoglobin precipitated with ammonium sulphate. The precipitate is incinerated and the iron determined iodometrically. Using the hæmoglobin number of Linnofski, according to which chemically pure hæmoglobin contains 0.3345 per cent., a calculation of the hæmoglobin content of the sample under examination is readily made. Commercial specimens of hæmoglobin were then shown to contain only 30, 40 to 60 per cent. of the pure substance, the rest being serum-albumen.—Pharm. Ztg., 48, No. 79 (Oct. 3, 1903), 804.

Milk—Analysis.—James O. Jordan communicates a paper on milk analysis in which he describes in terse but explicit language the principal processes and most practical methods for determining the important constituents and adulterants of milk, such as total solids, fat, ash, milk sugar, proteids, and such foreign substances as annatto, caramel, aniline colors, formaldehyde, and salicylic acid. The paper cannot be profitably condensed, and must, therefore, be consulted in the original, in Amer. Drugg., 44, No. 5 (Mar. 14, 1904), 135-137.

Milk.—Preservation by urotropin, see *Hexamethylene tetramine* under "Organic Bases."

Milk—Objections to the Use of Formaldehyde as Preservative.—A. Trilhat insists that the use of formaldehyde as a milk preservative should be forbidden, since it renders the casein less soluble and digestible, and at the same time always remains uncombined even at the time when the milk begins to show signs of decomposition. It seems, therefore, that even when the smallest effective quantity from 1 : 5,000 to 1 : 10,000 of formalin is employed, only a trace of this is fixed by the milk albuminoids. It follows that the use of such a formalin-preserved milk is equivalent to the ingestion of so much formalin. In view of the known action of formaldehyde on the mucous membrane, and the facility with which it is absorbed by the tissues, even in extreme dilutions, the continuous use of such milk, especially by infants, cannot be regarded as harmless. The presence of formalin in milk does not prevent the action of rennet ferment, but it lengthens the time necessary for curdling; the weight of the curd is approximately the same in normal and formalin-preserved milk. But when subjected to peptic digestion, the casein of the preserved milk invariably leaves a greater amount of insoluble residue than that from normal milk, the excess amounting to 5 or 6 per cent. When, however, freshly prepared casein from normal milk is brought directly into contact with formalin, in the same proportion, it is even more indigestible; the excess of insoluble residue after peptic digestion is then raised from 10 to 30 per cent. Possibly the fat present in milk prevents, to a certain extent, the

action of the formalin on the casein. The rapidity and ease with which casein is altered by formaldehyde is shown by placing a little of that substance, previously dried, under a bell jar with a vessel containing formalin. On testing the solubility in dilute alkali of the casein thus exposed to formaldehyde vapor, it will be found to diminish rapidly; in twelve hours it will be quite insoluble, and be unaffected by pepsin, although its weight has not sensibly increased.—Pharm. Journ., May 14, 1904, 649; from Compt. rend., 138, 720.

Cream Kumyss—Method of Manufacture.—Julian L. Waller gives the following method for manufacturing "cream kumyss" successfully: Take three large champagne bottles and to each one add one-third of a cake of compressed yeast, old style, long cakes, about two and one-half inches long by one-half inch wide, and one-half thick, or one-half, new style flat cakes. Then dissolve one ounce of sugar in 4 fl. oz. of distilled water, and put this in each of the bottles, then fill each with the very best milk to within five inches of the top or just to the shoulder of the bottle, leaving enough room for generated gas. Put a plug of cotton in the neck of each bottle to keep out dust, put away in a place at about the room temperature for twelve hours, remove cotton, and cork with wine corks, which tie securely: then put them in an ice-chest. After from about ten to twenty days this is ready and is called "ferment," which is the basis of the kumyss. To make the kumyss, pour six gallons of pure, fresh milk in a nice clean earthen jar containing two gallons of distilled water after having dissolved 8 ounces of sugar in one-half gallon of the water. Then put a champagne tap in each bottle of the "ferment," and run it into the jar containing the milk and water. Stir thoroughly. Fill the champagne bottles to within four or five inches of the lip of each bottle, but let stand for twelve hours, and cover the bottles with a cloth. Then soak your wine corks in hot water, and by means of a corker, ram the corks in the bottles and tie securely. Put them in an ice-chest for ten days, when they will be ready for use.—Merck's Rep., Aug., 1903, 218.

Egg-Yolk—Lecithin, Coloring Matter, and Other Constituents.—Dr. E. Laves, adopting a new method for the separation of lecithin and the albuminoids of egg-yolk, has subjected these and other constituents to examination, with the following results: He has demonstrated the existence of a

Manifoldly Unsaturated Fatty Acid, of higher molecularity than the fatty acids—palmitic, stearic, and oleic—hitherto found in the yolk; that by the use of suitable solvents, the

Coloring Matter may be obtained in a nearly pure condition, free from fat and cholestrin, without resorting to saponification; that

Cholestrin exists not only in a free condition in egg-yolk, but also in chemical combinations; that

Lecithin exists in egg-yolk, not only in the free state and united to albumin, but also in other combinations—probably occurring united with cerebrin as protagon; and that by fractional solution with various easily volatile solvents and subsequent purification over the cadmium salts, lecithins may be obtained, which vary materially in consistence, solubility, appearance, and chemical composition. Furthermore, in contradiction to the statements in the literature that egg-yolk contains

Glucose, the author has been unable to find any, although operating with 8 kgm. of yolk. He finds also that

Cerebrin is a constant constituent of egg-yolk; but whether it is present in the free state, or in combination with lecithin, must be the subject of further experiment.—Apoth. Ztg., 18, No. 78 (Sept. 18, 1903), 688.

Egg-lecithin—Character of its Constituent Fatty Acids.—By saponifying egg-lecithin and precipitating the fatty acids as barium salts, H. Cousin has isolated linoleic acid, which was identified by oxidizing it to tetra-oxy-stearic acid, $C_{18}H_{32}(OH)_4O_8$, forming white needles melting at 171° – 172° C. The remaining fatty acids, precipitated as lead salts, proved to be oleic, palmitic and stearic acids, the existence of which has previously been recorded.—Pharm. Journ., Aug. 15, 1903, 269; from Compt. rend., 137, 68.

Lecithin—Preparation of Iodine Compounds.—J. D. Riedel gives the following method of preparing compounds of lecithin with iodine in different proportions: 5 Kgm. of lecithin are dissolved in 3 liters of alcohol by heat, and the solution when cool is mixed with a solution of 0.6 Kgm. of iodine monochloride, gradually added with shaking. The mixture is then vigorously shaken at a temperature of 40° – 50° C. until, after several hours, the reaction is completed. After cooling in ice water the alcohol is decanted from the waxy mass, which is washed several times by kneading with alcohol or acetone, or a mixture of the two, at 40° to 50° , again cooled in ice water, and the alcohol or acetone poured off as before, when the mass is dried at 30° to 40° C. in a vacuum. The

Iodlecithin thus obtained constitutes a red-brown, odorless, or at most, faintly odorous mass of the consistence of wax, which differs from lecithin in appearance only by its darker color, and contains 20 per cent. of iodine. Higher iodinated lecithins are obtained in an analogous manner. The iodlecithins are easily soluble in ether and in warm alcohol, less soluble in cold alcohol and acetone, and in cold water, like lecithin, they simply swell to mucilaginous consistence. They are decomposed with evolution of iodine vapor on heating with conc. sulphuric acid, while by treatment with alkalis they are split into choline, glycerophosphoric acid and iodized fatty acids. The 20 per cent. iodlecithin has so far been the only one introduced as a therapeutic agent, and is recommended in all cases in which iodine is indicated, particularly in scrophulous and luetic diseases.—Pharm. Ztg., 49, No. 3 (Jan. 9, 1904), 26.

Enzymes—Reversibility of Action.—Dr. Croft Hills produces evidence to show that enzyme action may be reversible. Thus the hydrolysis of maltose to glucose by yeast maltase in concentrated solution seems to be incomplete, the phenomenon apparently being due to polymerization of the glucose by a reversible process, so that in solutions of maltose or glucose, or of the mixed sugars, synthesis and hydrolysis take place until the system approaches a state of chemical equilibrium. It is shown that the synthetic action of a maltase-containing yeast-extract results in the formation of two isomeric bioses—one not hitherto described, which is termed revertose, the other, although not isolated, is in all probability maltose. Both taka-diastase and the pancreatic ferments also have a reversible synthetic action on glucose. The yeast *S. marxianus* was successfully used as a reagent for separating maltose from glucose, since it ferments the latter sugar, but leaves the former untouched.—Pharm. Journ., Feb. 13, 1904, 184; from Trans. Chem. Soc., 1903, v., 83.

Almond-Emulsin—Presence of an Additional Ferment.—The experiments of E. Bourquelot and Hérissé convince them that the hydrolizing action of almond-emulsin on lactose, first recorded by E. Fischer, is not due, strictly speaking, to emulsion, but to another ferment associated with it, which they name

Lactase. They find that pure emulsin, such as occurs in *Aspergillus niger* and in *Polyporus sulphureus*, has no action on lactose, while the impure emulsin from bitter almonds, peach and apricot kernels, and from apple-pips, has a marked hydrolizing action on that sugar. The hydrolizing action of the two kinds of emulsin on glucosides being identical, it follows that the emulsin derived from almonds and similar source must contain an additional ferment.—Pharm. Journ., Aug. 15, 1903, 269; from Compt. rend., 137, 56.

Malt Diastase—Action on Potato Starch Paste.—In a previous paper (1892) Bernard F. Davis and Arthur R. Ling have shown that when malt diastase is heated in aqueous solution above the temperature at which the activity of the enzyme is at its optimum, namely, 55° C., the reaction with potato-starch paste at about 55° is not only slower, but different products are formed; thus *d*-glucose can be readily isolated from them after the reaction has been allowed to proceed for several hours. Special experiments, employing the same quantities of diastase which has not been heated in solution above 55°, show that *d*-glucose is not formed either from starch paste or from maltose. It therefore appears that the production of this sugar is connected with the pre-heating of the hydrolytic agent in solution above 55° C. As a result of a very large number of new experiments, which will be published soon, the authors have arrived at the following conclusions: The effect of heating a solution of diastase as above indicated is to weaken its action and also to produce an alteration in the enzyme molecule, which is, moreover, a permanent one, for the diastase

retains its altered properties when re-precipitated from its solution by alcohol and allowed to act on starch paste at or below 55°C . The alteration of the diastase is assumed by the production of *d*-glucose when it acts on starch paste, and it appears to commence when a solution of the enzyme is heated below 60° , although, judging from the small amount of *d*-glucose formed by its action, the change at the last-named temperature is not complete. As the temperature of pre-heating the solution is increased, the amount of *d*-glucose it is capable of producing also increases, the maximum amount being obtained by the action of diastase which has been pre-heated in solution at 68° to 70°C . for fifteen to thirty minutes. Above this temperature the destruction of the enzyme is so rapid that a much larger proportion of it has to be employed to attain the stage of the reaction at which *d*-glucose appears. Still *d*-glucose is formed by diastase which has been restricted at temperatures up to 78° , and probably above this. It has been observed in all cases that, when after the maximum amount of *d*-glucose has been formed, the solution is kept at the temperature of hydrolysis, usually 55°C ., the sugar just mentioned diminishes in amount, and the occurrence of this apparent condensing action of the enzyme may probable explain the failure in several cases to detect *d*-glucose among the products of hydrolysis (see below). The maximum amount of *d*-glucose formed in any case does not exceed about 12 per cent. of the total hydrolytic product.—Chem. News, Oct. 9, 1903, 179.

In connection with the above it is of interest that Brown and Millar have shown that the so-called "stable dextrin"—one of the products of the hydrolysis of potato-starch paste by diastase—is converted by further action of diastase into a mixture of about equal parts of *d*-glucose and maltose, a statement, which stands in apparent antithesis to those made by Davis and Ling in the paper above quoted. Calling attention to this, Mr. Ling states that he has confirmed the results of Brown and Millar, and has found further that other isolated products of diastatic action yield a proportion of *d*-glucose when submitted to the further action of unrestricted diastase; thus the maltodextrin, *a* of Ling and Baker, when treated in 3 per cent. solution with an active preparation of diastase at 55° for 140 hours, gave the constants $[\alpha]_{\text{D}, 20} 127.6^{\circ}$, $R_{20} 105.6$, corresponding approximately with maltose, 90 per cent., *d*-glucose, 10 per cent. The presence of 10.5 per cent. of *d*-glucose in the product was proved by weighing the phenylglucosazone formed under standard conditions. Taking into account the fact that potato-starch paste is never completely converted into maltose, although the final product has the constants of that sugar, and that a substance is always present which is identical with the isomaltose of C. J. Lintner, the simple dextrin of Ling and Baker, and the dextrinose of Syniewski, which, when isolated and submitted to the action of diastase, yields *d*-glucose, the author suggests that the reason no *d*-glucose can be detected among the products of the action of unrestricted

diastase on starch paste, is that that sugar is immediately condensed by the action of the enzyme-forming dextrinose. When, however, diastase is pre-heated, its condensing action is weakened, and the *d*-glucose formed can be isolated. Attempts to condense *d*-glucose or mixtures of it with maltose have not been successful.—Ibid., 179.

Gastric Juice—Method of Estimating Free Hydrochloric and Lactic Acid Content.—F. E. Niece describes two processes, the one gravimetric, the other volumetric, for the estimation of free hydrochloric and lactic acids in the gastric juice, and recommends them as combining trustworthiness and accuracy with expedition. The paper is too lengthy for reproduction here, and cannot be profitably condensed. It must, therefore, be consulted in the original Proc. Pa. Pharm. Assoc., 1903, 197-199.

Pepsin—Manufacture on a Commercial Scale.—W. H. Jenkins communicates a detailed description of the method of manufacturing pepsin as modernly developed, from which the following will doubtless prove interesting information not available in works of reference. While pepsin can be prepared from the stomachs of other animals, the mucous membrane of the stomachs of hogs is used because most conveniently available. After emptying, the stomachs are carefully washed in cold water, avoiding violent, energetic motion, as a great deal of the pepsin contained is prone to be removed and lost. The outside of the stomachs is trimmed away. The pepsin-containing membrane is chopped into small pieces and placed in a 3- or 4-per cent. aqueous solution of hydrochloric acid, the usual receptacle for this digestion being a large, open-headed hogshead, in which it is allowed to remain at a temperature of 104° to 122° F., with frequent stirring, until it undergoes self-digestion. This solution or self-digestion requires from 36 to 48 hours, or sometimes longer. At this point of the process the solution is liable to decomposition, especially in the presence of strong, oxidizing substances, like ozone occasioned by thunderstorms; hence careful watching is necessary. An antiseptic condition is produced by passing sulphur dioxide into the solution until it smells strongly of the gas; the gas also bleaches the product. The solution is then allowed to stand and clarify itself by the precipitation of the mucous. The putrefactive changes which sometimes take place cause no material injury to the pepsin. After clarification the clear liquid is decanted or siphoned off, and to it is added common salt, a uniform temperature of 94° F. being maintained until the pepsin is separated by precipitation. This precipitate—the floating scum—is collected, pressed and dried. The residual solution contains practically all the “peptones,” which may be obtained by allowing the salt to crystallize out and then evaporating the clear solution.

The *crude pepsin* (obtained as above ? Rep.) has a faint odor, a brownish-yellow color and a slightly saline taste. It is very active, and meets certain requirements of trade. To produce the

Standard Scale Pepsin, the crude pepsin, either dry or in a moist state,

is dissolved in weak hydrochloric acid, and this solution subjected to dialysis until the salt has been separated; the purified solution is afterwards concentrated in a vacuum apparatus at a temperature not exceeding 100° or 105° F. The concentrated solution is then spread in thin layers on glass plates, about 15 inches wide and 20 inches long, with the projecting edge one-quarter inch high. These plates are then placed on shelves, arranged to hold a number of them, in a drying room, at a temperature of 102° F., and well protected from dust, when the thin layer of solution is dried as rapidly as possible. When thoroughly dry, the product is scraped from the glass plates. So obtained, scale pepsin possesses a digestive power of 3,000. Powdered pepsin is obtained by grinding in mills, in which it must be carefully protected from humidity on account of its hygroscopic nature. The yield of pepsin varies and depends upon the class of hog stomachs used. In a test, 1,016 lbs. of membrane ready for digestion yielded 39 lbs. of high-grade pepsin, or 2.8 lbs. from 100 stomachs. In another, the yield was only 1.8 lbs. from 100 stomachs.—Merck's Rep., June, 1904, 156.

Pepsin—Method of Facilitating Solution in Prescriptions.—H. A. B. Dunning observes that the solution of pepsin in aqueous menstrua is not quickly accomplished, because the pepsin agglutinates and adheres to the end of the pestle and sides of the mortar in which it is being dissolved. If one of the ingredients of the prescription be glycerin, and the pepsin be thoroughly distributed through it, and the water added subsequently, a perfectly smooth mixture results with the rapid solution of the pepsin. If syrup be present and glycerin not, the prescription may be prepared in the same manner, though syrup is not so satisfactory. The efficiency of this method of mixing pepsin is better demonstrated in the preparation of large quantities of pepsin solutions containing glycerin as one of the solvents.—Drugg. Circ., 48, No. 2 (Feb., 1904), 29.

Yeast Enzyme—Probable Identity with "Erepsin."—S. H. Vines having last year discovered in many plants a protease resembling the recently-discovered *erepsin* of the animal body (see also Proceedings, 1903, 981), has since then endeavored to determine whether or not the proteolytic phenomena of yeast may not be due in part to the presence of an enzyme of this character, with results which indicate that this is the case. It was ascertained, in the first instance, that a filtered watery extract of yeast readily decomposes the simpler proteids, such as albumoses and peptones, into non-proteid bodies, such as leucin and tyrosin. Such an extract was, however, in no case observed to exert any digestive action upon a higher proteid, such as fibrin. The conclusion to be drawn is that the protease extractable from yeast by water is neither a pepsin nor a trypsin, but is an erepsin. It is, however, quite true that yeast contains a protease that digests fibrin. If yeast be extracted—instead of with distilled water—with a 2-per cent. solution of common salt (NaCl), a liquid is obtained

which digests fibrin with certainty. What, now, is the nature of this protease that digests fibrin? Like the erepsin, it can act through a considerable range of alkalinity and acidity, and so resembles trypsin rather than pepsin. Moreover, it must be borne in mind that up to the present there is no evidence that pepsin exists in any other plant. Though the point can only be finally settled by separating and isolating the two proteases, the probability is that this peptonizing enzyme is a vegetable trypsin.—Pharm. Journ., Feb. 27, 1904, 246; from Proc. Linn. Soc., Feb. 4, 1904.

Antiferments—Presence in Parasites.—E. Weinland has made a series of interesting experiments to ascertain the reason why the digestive secretions do not attack the body of living organisms, such as *tænia*, which, in the opinion of J. Frenzel (1891), is due to the presence of an antiferment which they secreted. Weinland took a certain quantity of fibrin and placed it in a pepsin solution in order to dissolve it, at the same time adding a small quantity of liquid obtained from the tape-worm (*tænia*). He found that in this case no digestion of the fibrin occurred, even though it was left in contact for an indefinite period, but otherwise it would be dissolved in a few hours. He thus considers that it is not the living tissues themselves which resist the action of the digestive liquids, but the secretions with which they are impregnated. The anti-ferment which he succeeds in extracting is very powerful in its action, and it keeps its properties for many months; it loses them by boiling, however. A temperature of 60° C. for ten minutes has but little effect, but at 80° the activity is lessened. The active principle can be precipitated from the juice of the *tænia* by alcohol. Although it opposes the action of pepsin, a ferment and antiferment can be put in presence without destroying each other. The latter seems to exert only an opposing, and not a destructive, action on the ferments, and when removed the ferments commence to act as usual.—Scient. Amer., 90 (1904), 227.

Epinephrin and Its Hydrate—Adrenalin—Chemical Constitution and Relations.—Dr. John R. Abel communicates a comprehensive resumé of his studies concerning the nature of the chemical constituents of the suprarenal gland or capsule, from which it appears that, although Vulpian had observed in 1856 that the fluid expressed from the capsules of different animals behave in a striking manner toward ferric chloride and toward other oxidizing agents, giving reactions not obtainable by any other fluid of the body, it was not until 1894 that renewed interest concerning the nature of the substance producing these reactions was awakened. Vulpian had attributed the fine green color produced with salts of iron, and the pink and rose-red color produced with iodine, water and ammonia, to a peculiar chromogenic substance, while Krukenberg (1885) pointed out that the substance producing the reaction was more likely pyrocatechin accompanying the chromogen; and this view, supported by the experiments of Brunner (1892), led to the firm belief that pyrocatechin was a

constituent of the gland. The observations, however, of Schaefer and Oliver (1894) and of Cybulski and Szymonowicz (1895), that a very minute amount of an aqueous extract of the medulla of the gland will raise arterial pressure, coming at a period when interest in the subject of internal secretion was at its height, led to a more systematic study of the chemical constituents of the suprarenal gland, and it was pointed out by Moore (1895), and again by Fraenkel (1896), that the blood-pressure-raising constituents and Vulpian's chromogen are one and the same thing; while Mühlmann (1896), still adhering to the pyrocatechin theory, admitted that pyrocatechin was not present *as such* in the gland, but in the form of combination with the active principle, from which it may be split off by boiling with dilute hydrochloric acid. In 1897, the author (Dr. Abel) and Crawford showed that the active principle may be precipitated from the *aqueous* extracts of the suprarenal gland by treatment with benzoyl chloride and sodium hydrate; that a benzoyl product was thus produced from which the active principle, which was named by these writers "epinephrin," was obtained on treatment with hot dilute sulphuric acid in the form of a sulphate of tarry consistency, and that this possessed great physiological activity, gave the color reaction of Vulpian, reduced silver nitrate, and possessed the other specific qualities of suprarenal extracts. In two subsequent papers (1898) Dr. Abel showed that "epinephrin" is a basic substance, which is thrown out of its solutions in acids by ammonia in the form of a flocculent compound, and then rapidly loses its power to raise arterial pressure; that the free base and its salts give reactions with a considerable number of alkaloidal reagents, as well as the color reactions, &c., attributed to Vulpian's chromogen, but that salts of this base possessed a high degree of physiological activity. It is impractical, however, within the narrow scope of this report to enter into detail concerning Dr. Abel's experiments, and comparison with the results of other experimenters, which must be consulted in the paper from which this is abstracted, the practical conclusions of which may be outlined in the following:

The substance originally described by Dr. Abel under the name of "epinephrin," to which he assigned the empirical formula $C_{17}H_{15}NO_6$, has since been found to have retained an unsaponified benzoyl radical— $CO.C_6H_5$ —and elimination of this benzoyl group and substitution of the displaced hydrogen atom for it, then led to the formula $C_{10}H_{11}NO_3$, as an adequate empirical expression for epinephrin with alkaloidal properties. Further investigation, however, showed that if sufficient ammonia was added to solutions containing the epinephrin-benzoyl compound, a physiologically active, crystalline, non-alkaloidal form of epinephrin was precipitated, and this was proven to have an elementary composition expressed by the formula $C_{10}H_{13}NO_3 \cdot \frac{1}{2} H_2O$, while the physiologically inactive, alkaloidal epinephrin, obtained from this by saponification with mineral acids,

has the formula $C_{10}H_{13}NO_3$. In accordance with these results and observations the formula for the author's original epinephrin, which must now be considered as

Mono-benzoyl Epinephrin, must now be corrected to $C_{17}H_{17}NO_4$ ($= C_{10}H_{12}NO_3 \cdot C_6H_5CO$). This compound yields on addition of ammonia in excess a crystalline hydrate,

Epinephrin Hydrate, $C_{10}H_{13}NO_3 \cdot \frac{1}{2} H_2O$, which in its less pure form is known as *Suprarenin* (Fürth) and *Adrenalin* (Takamine), and also as *Suprarenalin* (Armour & Co.); and from this hydrate the alkaloidal form of

Epinephrin, $C_{10}H_{13}NO_3$, is obtained by a simple process of dehydration, either by solution in concentrated hydrochloric or sulphuric acids, by short exposure to very dilute mineral acids in the autoclave at pressures of 2 or 3 atmospheres, or, also, by a brief exposure *in vacuo* of the thoroughly crystalline hydrate to a temperature of 177° —the latter method, however, being less economical on account of loss due to secondary changes.

In his initial investigations, Dr. Abel had failed to obtain the active principles in a crystalline and physiologically active condition by direct precipitation from the gland extracts; probably because he used either an insufficient quantity of ammonia or too dilute a solution of the active principle, although he had demonstrated that epinephrin is a basic substance and had repeatedly shown that it can be precipitated as a flocculent substance by ammonia. It thus remained for Takamine to make the observation that ammonia precipitated the active principle in a crystalline condition directly from a sufficiently concentrated aqueous solution of the gland, although, as before stated, his substance—*adrenalin*—cannot be considered the pure principle, but, as well as suprarenin and suprarenalin, may be converted into such by suitable treatment. With regard to the

Preparation of Pure Epinephrin Hydrate, the author observes that this may be accomplished by direct precipitation from aqueous gland extract and subsequent precipitation of the crude crystalline product. But in practice it is more convenient, and the yield greater, to take advantage of the solvent effect of trichlor-acetic acid on the substance, this method being explained in the following example from actual practice: 11.13 Kgm. of beeves' glands, weighed after being freed of adherent fat and tissue, were finely minced and the mass divided among a number of $2\frac{1}{2}$ -liter flasks, so that they were about half filled. Five liters of absolute alcohol, containing 175 Gm. of trichlor-acetic acid, and equally divided among the flasks, were now added in very small quantities at a time with vigorous shaking, this operation requiring great care so that the acidulated alcohol may well penetrate the tissues and mix with their water instead of merely coagulating and hardening the individual particles. The mixture is allowed to stand over night, then filtered under pressure, and the nearly

colorless filtrate—amounting to 5 or 6 liters—is concentrated to 380 Cc. by evaporation under diminished pressure. It is now again filtered under pressure, to remove a flocculent precipitate, and it is now only necessary to add ammonia of sp. gr. 0.944, stirring gradually, when a veritable rain of crystals is seen falling to the bottom of the beaker, the precipitation being complete as soon as the solution smells of ammonia. The crystalline precipitate is immediately filtered off, subjected to a *prolonged* washing with water and to shorter washings with absolute alcohol and with ether, and is then dried over sulphuric acid. When dry the product was almost snow-white, and weighed 23.79 Gm., and, while containing certain impurities (principally mineral constituents, and possibly to the extent of 10 or 12 per cent.), is considered pure enough in other respects for all local therapeutic applications in the strength of solution usually employed. Nevertheless, these impurities are very easily removed, the method being as follows: The 23 Gm. of the crude substance was stirred up in 80 Cc. of water containing 6 Gm. of oxalic acid, and then mixed with 800 Cc. of absolute alcohol, added in small quantities at a time with vigorous stirring. Ether was then added until the total volume was nearly 1 liter, and the flask set aside for a day or more, when the alcohol-ether fluid can be decanted from the abundant sticky precipitate. This precipitate, containing almost all of the substances, is dissolved in about 50 Cc. of water containing 12 or more Gm. of trichloroacetic acid; absolute alcohol is added to the solution in small quantities at a time until 800 Cc. have been added, this being followed by approximately 150 Cc. of ether, and the whole is set aside until the supernatant liquid is clear. The mineral constituents (alkaline earth) will then be found in the white precipitate formed, while the active principle, together with some water-soluble mineral constituents, is contained in the alcohol-ether fluid. From this fluid the pure active principle is now obtained by precipitation with ammonia, collection in filters, very thorough washing with water, alcohol and ether, and drying as before. It is entirely ash-free. By further manipulation of the minced gland, which, under the above conditions was only partly extracted, an additional quantity of epinephrin hydrate was obtained, a total of 35.36 Gm. being the output without completely exhausting it, and the author therefore considers it safe to assume that the active principle is present in fresh beeeves' glands to the amount of 0.3 per cent.—*Amer. Journ. Pharm.*, 75, No. 7 (July, 1903), 301-325.

Epinephrin—Constitution and Formula.—H. A. D. Jowett has investigated the "epinephrin" of Abel. The analysis and molecular weight determinations of carefully purified material confirmed the formula, $C_9H_{13}O_3N$, first produced by Aldrich. In dilute acetic acid solution, the compound has $[\alpha]_D - 32.6^\circ$. On oxidation with potassium permanganate, methylamine and oxalic and formic acids were formed. By fusion with potassium hydroxide, a small amount of a crystalline substance was ob-

tained which gave the protocatechuic acid reaction with ferric chloride. On methylation with methyl iodide and sodium in methyl alcohol and subsequent oxidation with potassium permanganate, trimethylamine and veratric acid were obtained. The constitutional formula for the base is considered to be most probably as follows: $\text{OH.OH.CH.OH.CH}_2\text{.NH.CH}_2$. Pharm. Journ., Feb. 27, 1904, 247; from Proc. Chem. Soc., 20, 18.

Suprarenin—Preparation, Characters and Chemical Formula.—In a paper on the active principle of the suprarenal gland, suprarenin, Fürth gives the results of analyses which tend to confirm the formula $\text{C}_9\text{H}_{13}\text{NO}_3$ for this principle. Suprarenin can be prepared in a nearly pure condition by treating the iron combination of suprarenin with hydrogen sulphide, and then adding ammonia to the filtrate from the precipitated iron sulphide. Suprarenin separates in a crystalline condition if the liquid is sufficiently concentrated. A number of indefinite derivatives or decomposition products of the body are described, but none of them are of much use in throwing light on the constitution of this compound. A provisional formula is suggested, but is not supported by any convincing evidence.—Chem. & Drugg., Sept., 1903, 498; from Monatshefte, 1903, 261.

Suprarenin—Characters of the Commercial Product.—The active principle of the suprarenal capsule, as supplied in German commerce under the name of "suprarenin," is described by A. Wegrich as a yellowish crystalline powder, soluble with difficulty in water, and insoluble in alcohol and ether, but forming an emerald-green solution with dilute hydrochloric acid, which turns carmine-red on addition of ammonia, and again becomes green on addition of acetic acid. If, however, ammonia or carbonated alkalies are added to the hydrochloric acid solution in excess, the suprarenin is precipitated, but not by the fixed caustic alkalies, in which it is readily soluble. Alcohol does not precipitate it from its hydrochloric acid solution. The composition of suprarenin is stated to be $\text{C}_{10}\text{H}_{16}\text{NO}_3 + \frac{1}{2}\text{H}_2\text{O}$. It is believed to be a body resembling *amidopyrocatechin*, and is claimed to possess, in contradistinction of adrenalin, perfect stability.—Schw. Wchschr. f. Chem. u. Pharm., 42, No. 15 (April 9, 1904), 200; from Pharm. Post, 1903, 568.

Adrenalin Chloride—Value in Bubonic Plague.—Mr. R. B. K. Bose, in a recent issue of the "Calcutta Practitioner," states that adrenalin given in any stage of plague maintains the heart and pulse admirably well and brings down the temperature; that its effect in pneumonic and intestinal plague is far from encouraging, although in bubonic plague, uncomplicated with pulmonary and intestinal troubles, it is a sovereign remedy.—Chem. and Drug., May 7, 1904, 760.

Dysentery-Serum, possessing excellent protective and curative properties, is prepared by L. Rosenthal by the simultaneous immunization of horses with dysentery-cultures and -toxin. It is administered subcutane-

ously in doses of 20–40 Cc. per day, during the first days of the disease.—D. Med. Wchschr., 1904, No. 19.

Eumorphol—*A New Antitoxin*.—Hirshof has given the name of “eumorphol” to the serum of rabbits and mice which have been kept for a period under the influence of morphine. It is claimed that an antitoxin is thus produced which not only furnishes an antidote to opium poisoning, but affords a means of overcoming the morphine habit, and that, so far, neither local nor general secondary symptoms have followed the use of this serum.—Pharm. Journ., Aug. 22, 1903, 308; from Journ. Pharm. d'Anvers., 59, 147.

Oviserum is the name given by Turro to solution of the yolk of eggs in ovalbumin, obtained from fresh hens' eggs under special manipulation—the main features of which are the exposure of a mixture of the two egg-substances, obtained by vigorous shaking, during 20 or 30 days at a temperature of 35° C. in an incubator. The mixture separates into a semi-solid and a clear-liquid layer, the latter constituting the desired product. Oviserum is claimed to hold large quantities of egg-yolk in solution. Its therapeutic value is not yet established clinically, but preliminary observations point out its possible value as a protective against anthrax.—Bakteriol. Centralbl., 34, No. 1.

Rinderpest Serum is supplied in a stable and dry form, being obtained by adding to the liquid serum $\frac{1}{8}$ per cent. of sodium hydrate and drying it on glass plates. The yield is about 10.5 per cent., and the product is rapidly and nearly completely soluble in water.—Centralbl. f. Bakter., 1904, 36, No. 1.

Tuberclose-Antitoxin, which has recently been successfully prepared by Marmorek, has now a rival in a dry form of antitoxin prepared by an Italian chemist, F. Figari, of Genoa. But while Mamorek's preparation is the serum itself, Figari's is the entire coagulum of the blood of immunized animals, evaporated on a steam-bath at a temperature not above 55°, and finally dried over sulphuric acid in a vacuum. The brittle mass so obtained is reduced to powder and is claimed to have given good results in tuberculous cases when administered per os for a prolonged period in daily doses of 4 Gm.—Pharm. Ztg., 49, No. 8 (Jan. 27, 1904), 82.

Vaccine Lymph—Further Investigation Concerning the Use of Chloroform in its Preparation.—In continuation of his preliminary note on the value of chloroform in the preparation of calf vaccine (see Proceedings, 1903, 984), Dr. Allan B. Green gives an account of investigations since made. His experience in the further use of chloroform for this purpose, based on the preparation of a large number of vaccines during the past year, confirms the conclusions arrived at in the preliminary note. And meanwhile important additional knowledge has been gained, namely, that

chloroformed calf vaccine, if originally of sufficiently high potency, will, when prepared and stored under suitable conditions, retain for a considerable time a high degree of potency, and this notwithstanding that the extraneous organisms had been rapidly eliminated from it in an early stage of its preparation. The authors' experiments include examinations into the effect of temperature in the elimination of extraneous micro-organisms from the crude calf vaccine, the species of micro-organisms killed by the chloroform process, and the keeping properties of chloroformed vaccine.—Pharm. Journ., June 4, 1904, 779, 780.

Serpent Venom—First Aid in Case of Snake-bites.—Permanganate of potash as an antidote to snake poisons was first used by Sir Joseph Fayrer in 1869, and shown by Aynter Blythe in 1877 to be a complete chemical antidote to cobra venom when mixed *in vitro*, his results being confirmed by Lauter Brunton and Sir Joseph Fayrer in 1878. The two last-named experimenters, together with Dr. L. Rogers, of the Indian medical service, have now reported on a method of preventing death from snake-bites, capable of common and easy practical application, describe the instrument shown by Fig. 69, which was designed by Sir Joseph Fayrer to meet this requirement, since it can be constantly at hand when wanted and easy of application by unskilled persons. The instrument consists simply of a small lancet about $\frac{1}{2}$ inch long with a hollow wooden handle, in which crystals of permanganate of potash are contained. The way in which it is proposed to apply the permanganate is that anyone bitten by a snake should at once tear a strip from a turban, shirt, or any other article of clothing, and tie it as quickly as possible above the bite. A cut should then be made with the lancet over the site of the bite so as to convert the puncture made by the snake's tooth into a small wound. Into this the crystals of permanganate of potash, moistened with saliva if necessary, are to be rubbed. By means of this instrument, Dr. Rogers has been able to test the effect of permanganate of potash applied in the manner described on rabbits and cats. Five out of six animals experimented upon survived after the injection of cobra poison, and a similar number survived after the use of Daboia poison. These experiments are very satisfactory, inasmuch as they show that the utility of permanganate of potash is not confined to one class of venom, but that it acts equally well with the venom of all kinds of snakes. The results obtained five minutes after the injection of the poison were as good as half a minute after injection, so that although very rapid absorption occurs during the first few seconds, it seems probable that absorption soon becomes slow from local effusion, and that sufficient time would thus be afforded for the

FIG. 69.



Lancet.

application of the proposed antidote.—Chem. and Drugg., June 18, 1904, 988; from "Nature."

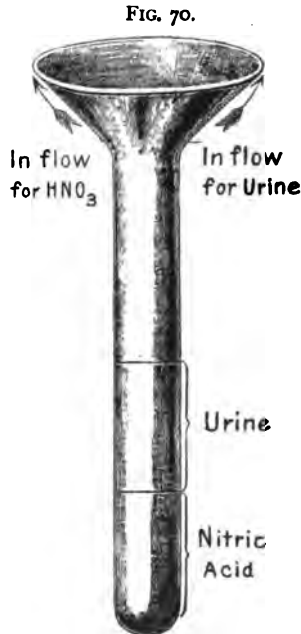
Sea-Snake Venom—Effect of Lethal Doses.—In continuation of previous observations on the poison of sea snakes, Dr. Leonard Rogers records the results of a series of experiments made on rabbits, cats and frogs with *Enhydrina* venom. He finds that this poison, in lethal doses, has no depressing action on the heart. The marked rise of blood pressure which is observed is secondary to failure of respiration, producing venosity of the blood. The primary action of the poison is the production of a respiratory paralysis by a direct action on the respiratory centre, this being very quickly followed by paralysis of the end plates of the phrenic nerves. This phenomenon may occur at a time when the sciatic nerves show no end-plate paralysis. The poison has a very marked action in paralyzing the end plates of motor nerves, but does not perceptibly affect the conducting powers of the nerve trunks themselves—in this respect resembling cobra venom and curare. The action of *Enhydrina* venom on the reflex functions of the spinal cord is slight, and altogether secondary in importance to its influence on respiration.—Pharm. Journ., 71, 3389 (Oct. 3, 1903), 481; from Br. Med. Journ., 2229, 676.

Viper Venom—Natural Immunity of Vipers to its Action.—C. Phisalia, in view of the conflicting results obtained by investigators since Fontana, in 1781, stated that "the venom of vipers is not a poison for its species of snakes," has reinvestigated the subject, and finds that vipers are so far tolerant of viper venom that they are practically, but not absolutely, immune to it. The lethal dose, either when the venom is introduced subcutaneously or into the peritoneum, is 500 or 600 times greater than it is for guinea-pigs. If, however, the venom be brought in direct contact with the brain of the snake, the relative immunity is much less marked, not exceeding twenty-five to thirty times that of the guinea-pig. A viper may, therefore, be killed when fighting with another if the poison fangs penetrate the skull; but since the skull bones of these snakes are exceptionally hard, this is not likely to occur under ordinary conditions. It may, therefore, be concluded that viper venom is not a poison for vipers under the natural conditions of inoculation.—Pharm. Journ., Nov. 24, 1903, 786; from Compt. rend., 187, 270.

Choline—Unreliability of Halliburton and Mott's Test for its Presence in Blood.—Halliburton and Mott have shown that in cases of nerve degeneration choline appears in the blood, and have devised a test for its presence. This consists in extracting 4 Cc. to 5 Cc. of the blood four times in succession with absolute alcohol and precipitating the choline as a platinum salt with platonic-chloride, the choline platinochloride appearing as yellow octahedra. R. W. Allen and H. French now state that this method is unreliable, since both ammonium and potassium platinochloride

give yellow octahedra, and may not be eliminated by the absolute alcohol.—Pharm. Journ., Febr. 27, 1904, 247; from Journ. of Physiology, 30, 3 and 4, Proc. xxix.

Urine—Estimation of Albumen by Means of Nitric Acid.—J. Prescher carries out the modification of Bode of Hellen method of estimating the albumen in urine, which is dependent on the formation of layers of acid-albumin of various densities when urine is brought in contact with concentrated nitric acid, the density of which is proportionate to the amount of albumen, by the use of a funnel test-tube, constructed as shown by Fig. 70. The tube shows two principal divisions, the lines for the nitric acid which is carefully poured into the tube on the funnel side indicated; the upper division for urine poured into the tube in the same way on the opposite side. The size or density of the acid-albumin zones produced is read off on the graduations marked immediately above and below the point of contact of the two fluids. The specific gravity of the nitric acid is 1.153, and with careful manipulation it is quite possible to sharply divide the zones into four degrees of density, from which the quantity of albumen present in the sample may be estimated.—Pharm. Ztg., 48, No. 63 (Aug. 8, 1903), 637; from Chem. Ztg., 1903, No. 58.



Funnel Test-tube.

Urine—Delicate Tests for Bile-Pigments.—A. Jolles recommends the following test for the presence of bile-pigments in urine: To about 10 Cc. of the urine in a test-tube 2 to 3 Cc. of chloroform and 1 Cc. of a 10 per cent. solution of barium chloride are added, and gently shaken. The mixture is then centrifuged in a hand centrifuge, by which the chloroform layer with precipitate forms at the bottom. The supernatant fluid is poured off, the tube is filled up with distilled water, and again centrifuged. The watery layer is poured off, and 5 Cc. of alcohol is added, and the mixture, after being gently shaken is poured into a test-tube. To this is added 2 to 3 drops of an iodine solution, the mixture is gently warmed in a water-bath at 70° C. for a few minutes, and then filtered. The presence of the smallest trace of bile-pigments gives a greenish tint to the filtrate. The iodine solution is prepared by dissolving 0.63 Gm. iodine in 125 cubic millimetres of alcohol, 0.75 Gm. mercuric chloride in the same quantity of alcohol, mixing, and then adding 250 cubic millimeters of concentrated

hydrochloric acid. This solution should be preserved in the dark.—Pharm. Journ., Feb. 20, 1904, 216; from Biochemisches Centralblatt, Bd. II., 4, 104.

Urine—Novel Method of Determining the Presence of Bile-Salts.—Otto Grünbaum has devised a method for the determination of bile salts (glycocholates), which is based on the fact that their presence in urine diminishes the surface tension. The urine is filtered and diluted to a specific gravity of 1.010. A glass pipette, of about 2 Cc. capacity, and fitted with a quartz needle, is filled with urine, and the number of drops, which form on allowing it to empty, is counted. The pipette is previously standardized by adding known amounts of glycocholate of soda to urine, and counting the drops for each strength. A curve can thus be arrived at, and by working with the same pipette under the same conditions an accurate estimate can be made. Sugar, albumen, and abnormal pigments do not influence the result.—Pharm. Journ., Feb. 20, 1904, 216; from Journ. of Physiology, 30, 3 and 4, Proc., xxvi.

Urine—Deceptive Analytical Results from Presence of Formaldehyde.—Dr. Frank W. Kennedy reports observations which indicate that the addition of formaldehyde to urine as a preservative leads to deceptive results in analysis, and based upon these observations offers the following for consideration:

1. Formaldehyde as an artificial ingredient of the urine will lead to deceptive results in urinalysis by (a) making the urine appear albuminous when it is negative; (b) not giving a typical reaction when albumen is present.

2. The reliability of Introna's test, namely, the use of formaldehyde in albuminous urine as a reagent, is to be questioned, inasmuch as the effect of formaldehyde on negative urine is the same, though to a more marked degree, as that on albumen in solution, the difference in the color and density of the precipitate being immaterial.

3. As a factor in the production of a possible pseudo-albuminuria, the therapeutic use of urotropin is a subject well worthy of extended observation and study.—Drug. Circ., 48, No. 4 (April, 1904), 77.

Urea—Presence in Certain Fungi.—Max Bamberger and A. Landseidl record the existence of urea in two Tyrolese fungi, *Lycoperdon bovista* and *L. gemmatum*. As much as 3.5 per cent. was found to be present. This is the first record of urea being isolated from a member of the vegetable kingdom.—Pharm. Journ., March 12, 1904, 366; from Bull. Soc. Chim., 32, 85.

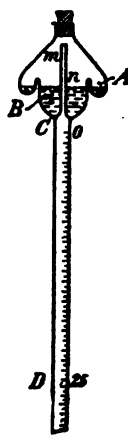
Urea—Remarkable Properties.—W. Ramsden describes some remarkable properties of pure urea. Thus, saturated aqueous solutions of the base prevent the coagulation of proteids by heat; they swell up and dissolve in it. Dry gelatin is dissolved at ordinary temperatures, forming a

40-per cent. solution ; coagulable albumens, in the cold, are converted into bodies possessing all the properties of alkali and acid-albumin according as the solution of urea used was either acid or alkaline. Urea, furthermore, accelerates the digestion of fibrin by pepsin up to 10 per cent. ; in larger quantities it retards the digestive action. A dead frog placed in saturated urea solution became translucent and fell to pieces in a few hours. The ligaments, tendons and connective tissue were converted into a clear, soft jelly. The muscles, if shaken briskly in water, fall completely into individual muscular fibres, which retain their structure and make admirable histological specimens. The hæmoglobin of the blood is converted into a body resembling alkaline hæmatine. No putrefaction ever takes place in saturated urea solutions, and this, coupled with the actions described, makes it a most valuable histological reagent ; tissues can be preserved in it indefinitely, and after a short immersion in water may afterwards be stained in the usual way.—Pharm. Journ., 71, 3389 (Oct. 5, 1903), 481 ; from Proc. Physiol. Soc.

Urea—Necessity of a Reliable Method of Estimation.—Dr. A. Hoffmann, after a critical review of the various methods in use for the estimation of urea, concludes that notwithstanding the numerous attempts, the formulation of a simple and at the same time sufficiently accurate method for the determination of the urea content in preparations and crude products, has not yet been accomplished, and therefore remains to be discovered.—Pharm. Centralh., 44, No. 43 (Oct. 22, 1903), 733–736.

Urometer—New and Convenient Form.—In order to obtain reliable figures in urea determination it is necessary, according to G. Sellier, to operate upon the urine clarified by means of lead subacetate with freshly-prepared bromine solution, and in the presence of glucose. The bromine solution is prepared according to Moreigne's formula ; 100 Cc. soda solution of 36° B., 70 Cc. of water, and 10 Cc. of bromine ; and the reaction is conveniently carried out by the aid of the new form of urometer, shown by Fig. 71. The bulb is divided by a central partition, *m*, *n*, into separate chambers, *A* and *B*, communicating with each other, and with the graduated tube, *C*, *D*, at *m*. In use, 2 Cc. of the clarified urine and 1 Cc. of 25 per cent. glucose solution are allowed to flow along the wall into *A*, and 15 Cc. of the bromine solution in the same way into *B*. The stopper is inserted, the apparatus is placed into water until both have attained the same temperature, and water is then admitted into the tube by lifting the stopper up to the zero mark, adjusting it to the level with the water of immersion. The reacting materials in *A* and *B* are then mixed, and the tube is then raised so that the interior and outer level of the water shall be identical, observing also

FIG. 71.

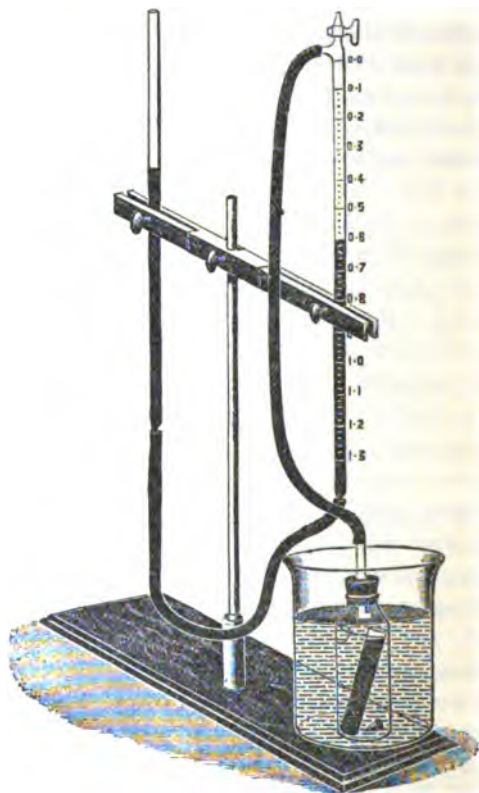


Urometer.

that the temperature has been readjusted, when the volume of nitrogen may be accurately read in cubic centimeter values.—Pharm. Ztg., 48, No. 62 (Aug. 5, 1903), 627; from Chem. Centralbl., 1903, ii., No. 4.

Uric Acid—New Method of Determination in Urine.—A. F. Dimmock and F. W. Branson have devised a new method for the determination of uric acid in urine, which has been found to work easily. The urine (100 Cc.) is warmed to about 40° C., and then saturated with ammonium

FIG. 72.



Nitrometer.

chloride (31 Gm.), the whole being well shaken in a graduated flask until complete solution of the ammonium chloride is effected and then left for from 2 to 12 hours (preferably the latter) for the complete precipitation and subsidence of the ammonium urate formed. The supernatant liquid is decanted, the residual ammonium urate collected on a small paper filter (about 5.5 Cm. in diameter) and carefully washed with a very dilute solution of ammonia, consisting of one part of liq. ammon. fort. in 1000 parts

of distilled water, until the filtrate yields 0.5 per cent. solution of silver nitrate acidulated with nitric acid—this indicating the absence of an appreciable amount of chloride. The precipitate, with the filter, is placed in a generating bottle shown in the accompanying illustration. A tube from the nitrometer employed by the author, a tube from a solution of sodium hyposulphite (100 Gm. sodium hyposulphite in 100 Gm. bromine) is lowered into the same bottle by the side of the filter. When immersed the latter in a vessel of water at room temperature, the connection may, after two minutes, be made with the nitrometer; the reaction being established so that the reagent may flow from the nitrometer into the generating bottle. The test, of course, may be conducted with the usual apparatus, &c., which are explained in some detail in the accompanying illustration. Suitable for urine containing from 1 in 1000 to 1 in 10,000.

Brit. Pharm. Conf., 1903, 439-441.

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 Brand, Joseph H., (1904) 900 Richmond st., Cincinnati, O.
 Brandel, Irvin W., (1903) University of Wisconsin, Madison, Wis.
 Brandenberger, Adolph, (1894) 130 E. High st., Jefferson City, Mo.
 Brecht, Frederick A., (1895) 209 3d st. W., Yankton, S. Dak.
 Breunert, August, (1901) 1335 Grand ave., Kansas City, Mo.
 Brewer, Howard D., (1902) 19 Oxford st., Worcester, Mass.
 Brewer, Justin S., (1903) 518 Hudson st., Hoboken, N. J.
 Brickman, Arthur O., (1898) 500 E. Baltimore st., Baltimore, Md.
 Briggs, Andrew G., (1890) 204 Howitzer Place, Richmond, Va.
 Brisley, Harry, (1894) Prescott, Ariz.
 Bristow, Thos. G., (1904) Hosp. Corps, U.S.A., Parang, Mindanao, P.I.
 Brookes, Virginia C. (Miss), (1901) Waelder, Gonzales Co., Tex.
 Brooks, George W., (1879) 1161 Myrtle ave, Brooklyn, N. Y.
 Brown, Chas. M., (1902) Cleveland State Hospital, Cleveland, O.
 Brown, George S., (1900) 2801 St. Charles ave., New Orleans, La.
 Brown, J. Lee, (1903) Marshfield, Ore.
 Brown, William A., (1893) Residence Unknown.
 Brucker, Carl, (1902) 37 Barclay st., New York, N. Y.
 Brundage, Albert H., (1892) 1073 Bushwick ave, Brooklyn, N. Y.
 Brunner, Norman I., (1878) 4th & Arch sts., Macon, Ga.
 Brunor, Emile, (1904) 2543 8th ave., New York, N. Y.
 Buchanan, Clark G., (1903) cor. 7th & St. Charles sts., Wellsburg, W. Va.
 Burdsal, Albert H., (1904) cor. Rockdale & Burnet sts., Cincinnati, O.
 Burg, John D., (1888) 4th & Brown sts., Philadelphia, Pa.
 Burgheim, Jacob, (1892) 1019 Congress ave., Houston, Tex.
 Burke, William H., (1902) 153 Grand River ave., Detroit, Mich.
 Burkhardt, Mark A., (1887) Third & St. Clair sts., Dayton, O.
 Burnham, Alfred A., Jr., (1891) 459 Dudley st., Boston, Mass.
 Burnham, Ralph F., (1904) 61 Broad st., Auburn, Me.
 Burns, Edwin M., (1897) 328 S. Superior st., Mason City, Ia.
 Burrough, Horace, (1883) 509 W. Lombard st., Baltimore, Md.
 Burrough, Horace, Jr., (1901) 509 W. Lombard st., Baltimore, Md.
 Burruss, Morris, (1904) care Havre Drug Co., Havre, Mont.
 Burton, John C., (1902) 3d st., Stroud, Okla. Terr.
 Busch, Miers, (1903) 511-515 Arch st., Philadelphia, Pa.
 Butler, Charles H., (1887) 182 W. 1st st., Oswego, N. Y.
 Butler, Freeman H., (1874) 391 Middlesex st., Lowell, Mass.
 Byers, Huizinga C., (1900) 28 King st., Pottstown, Pa.
 Byrne, John, (1893) 200 N. High st., Columbus, O.
 Caine, S. Lee, (1904) 107 S. Market st., Columbus, Miss.
 Caldwell, Joseph F., (1902) 17 Garrison ave., Allegheny City, Pa.
 Calkins, Eleazer E., (1903) 324 S. State st., Ann Arbor, Mich.
 Calvert, John, (1870) Kearney & Clay sts., San Francisco, Cal.
 Campbell, Albert A., (1902) 235 Rondo st., St. Paul, Minn.

- Campbell, Chas. B., (1902)
200 E st., N. E., Washington, D. C.
- Campbell, Milton, (1902)
426 S. 13th st., Philadelphia, Pa.
- Campbell, Theodore, (1902)
2101 N. 63d st., Overbrook, Philad'a, Pa.
- CANDIDUS, PHILIP C., (1857)
Mobile, Ala.
- CANNING, HENRY, (1865)
109 Green st., Boston, Mass.
- Capbern, Andrew E., (1903)
White Castle, La.
- Capdau, Pierre A., (1902)
940 Elysian Fields ave., New Orleans, La.
- Capper, Wm. E., (1892)
31 School st., Boston, Mass.
- Carl-Lee, Reuben B., (1903)
cor. Front & Fordyce sts., England, Ark.
- Carmack, George W., (1903)
Plattsburg, Mo.
- CARRELL, EUGENE A., (1875)
South st., Morristown, N. J.
- Carter, Frank H., (1891)
772 Massachusetts ave., Indianapolis, Ind.
- Cary, Silas B., (1903)
1201 Grand ave., Kansas City, Mo.
- Casalius, Tsidro, (1903)
1915 14th st., Tampa, Fla.
- Caspari, Charles, Jr., (1883)
University of Maryland, Baltimore, Md.
- Caspari, Chas. E., (1902)
712 N. Whittier st., St. Louis, Mo.
- CASPER, THOMAS J., (1867)
41 E. Main st., Springfield, O.
- Cassaday, O. U., (1899)
14 W. Federal st., Youngstown, O.
- Castillon, Louis A., (1904)
500 Dumaine st., New Orleans, La.
- Castlehun, Karl, (1902)
2 State st., Newburyport, Mass.
- CHANDLER, CHARLES F., (1867)
116th st. & Amsterdam ave., New York, N. Y.
- Cheatham, Thomas A., (1890)
Mulberry & 3d sts., Macon, Ga.
- Chipman, Gilbert S., (1903)
269 Pearl st., Cambridge, Mass.
- Chittick, Justus R., (1903)
Highland Park, Des Moines, Ia.
- Civins, Albert I., (1902)
5th & Lombard sts., Philadelphia, Pa.
- Clafin, Walter A., (1896)
Harvard Square, Cambridge, Mass.
- Clark, John A., (1890)
East King st., Hamilton, Ontario, Can.
- Clarke, Chas. J., (1904)
Main st., Paris, Ky.
- Claus, Otto F., (1901)
1116 Montgomery st., St. Louis, Mo.
- Claverie, Joseph S., (1904)
Columbia st., Covington, La.
- Claybaugh, Springer, (1904)
56 Evans st., Uniontown, Pa.
- Cleveland, Jule M., (1902)
Elberton, Ga.
- Cliffe, Wm. L., (1898)
2778 Kensington ave., Philadelphia, Pa.
- Cline, Raoul R. D., (1898)
1213 Post Office st., Galveston, Tex.
- Cloonan, Martin J., (1904)
11 Saginaw st., Pontiac, Mich.
- Cobb, Ralph L., (1883)
112 Superior st., Cleveland, O.
- Coblentz, Virgil, (1882)
115 W. 68th st., New York, N. Y.
- Cochrane, William W., (1904)
508 Park st., Atchison, Kan.
- Coffman, Walter T., (1904)
721 S. Main st., Salt Lake City, Utah.
- Colby, Chas. L., (1904)
Jackson, Minn.
- Cole, Victor L., (1890)
22 East Market st., Corning, N. Y.
- Coleman, John H., (1902)
380 Broad st., Newark, N. J.
- Colen, James A., (1892)
383 Court st., Brooklyn, N. Y.
- Collier, William K., (1897)
199 E. 7th st., St. Paul, Minn.
- Collins, Albert B., (1882)
50-52 Main st., Westerly, R. I.
- Collins, Frank A., (1904)
30 S. Main st., Akron, O.
- Collins, Mary E. (Miss), (1902)
9 Pleasant st., Westerly, R. I.
- Colton, James B., (1865)
766 Tremont st., Boston, Mass.
- Comfort, Newton C., (1904)
78 Calle Madrid, Manila, P. I.
- Cone, Earl H., (1901)
231 Lake st., Chicago, Ill.
- Cone, John W., (1876)
48 N. Main st., Providence, R. I.
- Congdon, George G., (1903)
Washington av. & 28th st., Newport Nes, wVa.

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| Conger, Frederic A., (1902) | <i>Crossman, George A., (1872)</i> |
| 499 Selby ave., St. Paul, Minn. | Raynham, Mass. |
| Conover, James A., (1903) | Crowdle, John E., (1894) |
| 241 W. Bay st., Jacksonville, Fla. | 81 Gardiner st., Newton, Mass. |
| Conrad, John, (1887) | Crum, John D., (1892) |
| 25 E. 47th st., Chicago, Ill. | 851 Pippin st., Oakland, Jacksonville, Fla. |
| Conzet, Rufus W., (1904) | Culbreth, David M. R., (1883) |
| 119 Cumberland st., Greenup, Ill. | 1307 N. Calvert st., Baltimore, Md. |
| Cooban, Benj. S., (1902) | Culpepper, Thomas J., (1903) |
| 559 W. 63d st., Chicago, Ill. | Greenville, Ga. |
| Cook, Alfred P., (1902) | Cumberledge, Samuel G., (1904) |
| 342 Spring st., Portland, Me. | 200-202 Broadway, Muskogee, Ind. Ter. |
| Cook, E. Fullerton, (1901) | Cureton, George D., (1902) |
| 145 N. 10th st., Philadelphia, Pa. | Limestone st., Gaffney, S. C. |
| Cook, Thomas P., (1877) | Curry, David W., (1894) |
| 114 William st., New York, N. Y. | 200 Broad st., Rome, Ga. |
| Cookson, Joseph W., (1902) | Curry, Gordon L., (1900) |
| 20 Main st., Kingman, Kan. | 104 Chestnut st., Louisville, Ky. |
| Coonley, Charles, (1903) | Daboll, Horace H., (1903) |
| Washington & Michigan sts., South Bend, Ind. | 119 State st., New London, Conn. |
| Cooper, Oscar H., (1904) | Dadd, Robert M., (1896) |
| Stamford, Tex. | 22 Grand ave., Milwaukee, Wis. |
| Cornell, Edward A., (1873) | Daggett, Chas. H., (1902) |
| Pine & Fourth sts., Williamsport, Pa. | 104 Daboll st., Providence, R. I. |
| Cornell, Edward C., (1902) | Daggett, V. Chapin, (1901) |
| Brookings, S. Dak. | 17 W. 34th st., New York, N. Y. |
| Corning, Albion J., (1898) | Daly, James E., (1902) |
| 1501 Bolton st., Baltimore, Md. | Residence Unknown. |
| Coté, André A., (1904) | Danek, John F., |
| 178 Ninth ave., New York, N. Y. | 1228 Washington ave. N., Minneapolis, Minn. |
| Cowan, John, (1897) | Darby, Edmund F., (1903) |
| Navy Yard, Charleston, Mass. | King st., Harrow, Ont., Can. |
| Cox, Daniel R., (1903) | Darby, Marvin H., (1904) |
| 96 S. Monroe st., Tallahassee, Fla. | Court st., Florence, Ala. |
| Crain, Z. A., (1904) | Dare, Charles F., (1889) |
| Humbolt ave., Redfield, S. Dak. | 84 E. Commerce st., Bridgeton, N. J. |
| Cramer, Max, (1881) | Davidson, Edgar C., (1902) |
| 1350 Tremont st., Boston, Mass. | Main st., Dawson, Ga. |
| Crampton, Ferd L., (1896) | Davies, John J., (1902) |
| 2301 Lexington ave., Kansas City, Mo. | 106 S. Main ave., Scranton, Pa. |
| Crawford, Frank E., (1902) | Davies, Llewellyn P., (1891) |
| 354 Friendship st., Providence, R. I. | Central City, Colo. |
| Crawford, Joseph, (1903) | D'Avignon, J. Eugene, (1888) |
| 2824 Frankford ave., Philadelphia, Pa. | 5 Sandwich st., Windsor, Ont., Can. |
| Crecelius, Chas. E., (1900) | Davis, Charles H., (1903) |
| 133 Main st., New Albany, Ind. | 30 State st., Bangor, Me. |
| Creighton, Mary L. (Miss), (1903) | Davis, Charles L., (1897) |
| Scio, O. | 63 State st., Newburyport, Mass. |
| Cresap, Philip P., (1904) | Davis, Eugene M., (1892) |
| 220 Main st., Lakeland, Fla. | 309 Lion st., Dunkirk, N. Y. |
| Criswell, Francis M., (1892) | Davis, Geo. B., (1904) |
| 7th & Florida ave. N. W., Washington, D. C. | 2324 Howard st., New Orleans, La. |

- Davis, Harry R., (1904) 2300 Indiana ave., Kansas City, Mo.
- Davis, John A., (1894) 700 N. Carey st., Baltimore, Md.
- Dawson, Edward S., Jr., (1876) 125 S. Salina st., Syracuse, N. Y.
- Dawson, John H., (1882) 23d & Valencia sts., San Francisco, Cal.
- Day, Edward J., (1901) 1338 Massachusetts ave., Cambridge, Mass.
- Day, William B., (1895) 465 State st., Chicago, Ill.
- DeForest, William P.*, (1879) 1477 Bedford ave., Brooklyn, N. Y.
- De Jonge, Cornelius, (1899) 36 Doughty st., Brooklyn, N. Y.
- De Lang, Alfred, (1887) 5 E. 5th st., Cincinnati, O.
- De Lorenzi, Albert, (1850) Main & Ervay sts., Dallas, Tex.
- Deck, Lewis C., (1901) Girard, Macoupin Co., Ill.
- Deemer, Geo. M. H., (1902) opp. Steel Pier, Atlantic City, N. J.
- Dennin, Edwin C., (1892) 383 Court st., Brooklyn, N. Y.
- Depeyre, Louis N., (1894) 408 W. Colfax ave., Denver, Colo.
- Devine, John, (1887) Santa Monica, Cal.
- Dewender, Wm. H., (1896) 167 Atlantic ave., Brooklyn, N. Y.
- Dewoody, William L., (1887) 120 W. Barraque st., Pine Bluff, Ark.
- Dickey, Chas. F., (1904) 700 E. 5th st., Kansas City, Mo.
- Dickinson, Arthur L., (1900) 297 Main st., Danbury, Conn.
- Dickman, Gustave A., (1902) 499 Selby ave., St. Paul, Minn.
- Diebert, Thomas I., (1882) 103 North Centre st., Pottsville, Pa.
- DIEHL, C. LEWIS, (1863) 1346 E. Broadway, Louisville, Ky.
- Diekman, George C., (1898) 115 W. 68th st., New York, N. Y.
- Dietz, Emil, (1903) 702 Germania st., Milwaukee, Wis.
- Dillenback, Garrett V. d. V., (1902) 144 State st., Albany, N. Y.
- Dillon, William E., (1903) 1526 Woodward ave., Detroit, Mich.
- Dilly, Oscar C., (1888) 2101 W. Walnut st., Louisville, Ky.
- Dimmitt, Addison, (1895) 5th ave. & Walnut st., Louisville, Ky.
- Dimond, Harry J., (1904) 330 Connecticut st., Buffalo, N. Y.
- Dinkler, Frank A., (1900) Hennessey, Okla. Ter.
- Dixon, J. Marion, (1894) Julia st. & Washington ave., Titusville, Fla.
- DOBBINS, EDWARD T., (1867) 1511 Samson st., Philadelphia, Pa.
- Dodds, Richard N., (1902) 5th & Monroe sts., Springfield, Ill.
- Dodson, James G., (1903) 423 Jackson st., Americus, Ga.
- Doehne, Geo., Jr., (1904) Austin, Minn.
- Doersam, Philip, Jr., (1903) Washington ave. & Marion st, Scranton, Pa.
- Dohme, Alfred R. L., (1891) Pratt & Howard sts., Baltimore, Md.
- DOHME, CHARLES E., (1863) Pratt & Howard sts., Baltimore, Md.
- Dohme, C. Louis, (1899) Pratt & Howard sts., Baltimore, Md.
- DOHME, LOUIS, (1859) Pratt & Howard sts., Baltimore, Md.
- Doliber, Thomas*, (1859) Atlantic ave. & India st., Boston, Mass.
- Donnel, Cornelius P., (1902) 431 Arch st., Philadelphia, Pa.
- Donohue, Henry, (1903) 702 Washington st., San Francisco, Cal.
- Dorsheimer, George V., (1903) 600-602 E. Walnut st., Des Moines, Ia.
- Dort, Edward H., (1903) Auburn, Neb.
- Dougherty, Samuel E., (1875) Linden, N. J.
- Douglass, Henry, (1875) 614 Wythe ave., Brooklyn, N. Y.
- Dow, John P., (1904) 2d & Ohio, Sedalia, Mo.
- Dowdy, Joseph F., (1894) 204 Main st., Little Rock, Ark.
- Downing, Benjamin F., Jr., (1886) 42 Broadway, Newport, R. I.
- Downing, Ernest A., (1903) 600 E. Grand ave., Des Moines, Ia.
- Drach, George L., (1902) 1839 Broadway, Cleveland, O.

- Drake, Frederick T., (1894)
7 Myrtle st., Stoneham, Mass.
- DRAKE, JOHN R., (1860)
365 E. Water st., Milwaukee, Wis.
- Drake, Wallace C., (1902)
1238 Euclid ave., Cleveland, O.
- Drechsler, Frank X., (1902)
168 Western ave. N., St. Paul, Minn.
- Dresser, George E., (1886)
Main st., Putnam, Conn.
- Drew, Walter I., (1896)
202 Brackett st., Portland, Me.
- Drossel, August A., (1902)
1203 Powell st., San Francisco, Cal.
- Drucker, Aug. E., (1904)
600 Van Ness ave., San Francisco, Cal.
- DRURY, LINUS D., (1871)
Warren & Dudley sts., Boston, Mass.
- Duble, Jesse B., (1904)
51 Manhattan ave., New York, N. Y.
- DuBois, William L., (1880)
281 Main st., Catskill, N. Y.
- Duckett, Walter G., (1876)
22d st. & Penna. ave., Washington, D. C.
- Duering, Henry C., (1901)
212 Benoist Bldg., St. Louis, Mo.
- Duggan, James, (1894)
254 Asylum st., Hartford, Conn.
- Dulaney, Joseph F., (1902)
McKinney, Callin Co., Tex.
- DUNN, JOHN A., (1867)
36 Doughty st., Brooklyn, N. Y.
- Dunn, Joseph H., (1903)
1234 Hillary st., New Orleans, La.
- Dunn, Minnie, Mrs., (1904)
227 S. Capital st., Iowa City, Ia.
- Dunning, H. A. Brown, (1902)
1522 Mt. Royal ave., Baltimore, Md.
- Durban, Sebastian C., (1883)
708 Broad st., Augusta, Ga.
- Durkee, Wm. C., (1885)
392 Boylston st., Boston, Mass.
- Dutcher, Alfred L., (1892)
109 Main st., St. Albans, Vt.
- Dye, Clair A., (1901)
Ohio State University, Columbus, O.
- Earhart, Fred. A., (1904)
8th & Chippewa, New Orleans, La.
- Easterday, Herbert C., (1893)
700 New Jersey ave. N.W., Washington, D.C.
- Eaton, Harry E., (1902)
Essex, Page Co., Ia.
- Eaton, Harvey K., (1902)
700 Columbus ave., New York, N. Y.
- Eberbach, Ottmar, (1869)
25 South Main st., Ann Arbor, Mich.
- Eberle, Eugene G., (1896)
care Texas Drug Co., Dallas, Tex.
- Eberle, Herman T., (1901)
204 Main st., Watertown, Wis.
- EBERT, ALBERT E., (1864)
426 State st., Chicago, Ill.
- Eccles, Robert G., (1885)
191 Dean st., Brooklyn, N. Y.
- Eckert, John, (1902)
167 Ferry st., Newark, N. J.
- Eckford, Joseph Wm.*, (1883)
Commerce st., Aberdeen, Miss.
- Eckler, Charles R., (1903)
701 E ave., Elyria, O.
- Eckstein, Andrew J., (1895)
125 N. Minnesota st., New Ulm, Minn.
- Edwards, Frederick B., (1894)
55 Farmington ave., Hartford, Conn.
- Ehrlicher, Henry M., (1892)
324 Court st., Pekin, Ill.
- Eichrodt, Charles W., (1892)
227 S. Illinois st., Indianapolis, Ind.
- Eigelberner, Harry B., (1902)
185 W. Randolph st., Chicago, Ill.
- Einstein, Morris, (1900)
1424 East st., Allegheny City, Pa.
- Elder, Herbert P., (1903)
cor. Main & First sts., Woodland, Cal.
- Elderdice, William J., (1902)
111 Baltimore st., Cumberland, Md.
- Eliel, Leo, (1882)
230 W. Washington st., South Bend, Ind.
- Elliott, Cassius E., (1904)
Main st., Sheridan, Ind.
- Elliott, Chas. H., (1899)
14th & Binney sts., N.W., Washington, D.C.
- ELLIOTT, HENRY A., (1859)
673 W. Lexington st., Baltimore, Md.
- Ellis, Evan T.*, (1857)
4409 Chestnut st., Philadelphia, Pa.
- Ely, Ernest S., (1904)
North Chestnut st., Barnesville, O.
- Emanuel, Louis, (1878)
2d ave. & Grant st., Pittsburg, Pa.
- EMICH, COLUMBUS V., (1863)
407 N. Green st., Baltimore, Md.
- Engel, Carl, (1904)
211 Poyntz ave., Manhattan, Kan.

- Engelhard, George P., (1903) 358 Dearborn st., Chicago, Ill.
- England, Joseph W., (1893) 415 N. 33d st., Philadelphia, Pa.
- Englander, Samuel, (1899) Navy Yard, Brooklyn, N. Y.
- English, George E., (1903) 704 Franklin ave., Cleveland, O.
- Eppstein, Jacob, (1902) 287 S. 5th st., Philadelphia, Pa.
- Ernst, Frank F., (1891) 186 Lamartine st., Jamaica Plain, Mass.
- Erwin, Sid A., (1904) 8 Jefferson ave. S., Battle Creek, Mich.
- Estabrook, Henry A., (1886) Fitchburg, Mass.
- Esters von Krakau, William, (1897) 25th & Folsom sts., San Francisco, Cal.
- Eitzel, John L., (1897) Clear Lake, Cerro Gordo, Ia.
- Euler, Frederick C., (1901) 1301 N. Broadway, St. Louis, Mo.
- Evans, George B., (1902) 1106 Chestnut st., Philadelphia, Pa.
- Evans, Joseph S., (1877) P. O. Box 567, Wes. Chester, Pa.
- Evans, Wm. J., (1904) 91 Fulton st., New York, N. Y.
- Evans, Wm. J., (1904) 1 E. Madison ave., Iola, Kan.
- Eyssell, George, (1889) 1036 Union ave., Kansas City, Mo.
- Faber, Walter E., (1900) 313 Bowery, New York, N. Y.
- Fairchild, Benjamin T., (1875) P. O. Box 1120, New York, N. Y.
- Fairchild, Samuel W., (1887) 84 Fulton st., New York, N. Y.
- Falk, John C., (1900) 2701 Stoddard st., St. Louis, Mo.
- Famulener, Lemuel W., (1902) care of Nelson, Baker & Co., Detroit, Mich.
- Faser, Henry M., (1904) Oxford, Miss.
- Federmann, Wm. M., (1901) 904 Main st., Kansas City, Mo.
- Feick, Charles, (1901) 301 Hanover st., Baltimore, Md.
- Feidt, George D., (1898) 604 Arch st., Philadelphia, Pa.
- Feil, Joseph, (1885) 513 Giddings ave., Cleveland, O.
- Felker, Walton A., (1904) Williamstown, Mo.
- Fennel, Charles T. P., (1886) 8th & Vine sts., Cincinnati, O.
- Fenner, Harvey A., (1902) Broad st. & Columbia ave., Philadelphia, Pa.
- Fickardt, Fred. L., (1904) 155 Main st. W., Circleville, O.
- Fieber, Gustavus A., (1893) 2400 Spring Grove ave., Cincinnati, O.
- Field, Claud, (1890) 318 E. St. Clair st., Indianapolis, Ind.
- Fifield, Winfield C., (1904) 819 Walnut st., Des Moines, Iowa.
- Finch, Chas. S., (1900) 134 Atlantic st., Stamford, Conn.
- Fink, Daniel J., (1903) Holdrege, Neb.
- Finlay, Alexander K., (1883) 124 Baronne st., New Orleans, La.
- Firmin, John C., (1893) 319 S. Main st., Findlay, Hancock Co., O.
- Firth, Samuel S., (1903) 939 Woodland ave., Cleveland, O.
- Fischer, Adolph J., (1904) Santa Fe, New Mexico.
- Fischer, Albert, (1904) 1730 Broadway, Brooklyn, N. Y.
- Fischer, Henry, (1901) 1948 Gravois ave., St. Louis, Mo.
- Fischer, Henry J., (1902) 439 Pearl st., Cleveland, O.
- Fischer, Richard, (1901) University of Wisconsin, Madison, Wis.
- FISH, CHAS. F., (1866) 348 Broadway, Saratoga Springs, N. Y.
- Fisher, Dora C. (Miss), (1902) 1018 S. 3d st., Leavenworth, Kan.
- Fisher, George W., (1893) De Land, Fla.
- Fisk, Frank E., (1902) 750 W. Harrison st., Chicago, Ill.
- Flemer, Lewis, (1895) 701 Maryland ave. N. E., Washington, D. C.
- Fletcher, David M., (1904) Van Ness ave. & Geary st., San Francisco, Cal.
- Fletcher, John W., (1894) Main st., Batesville, Ark.
- Flowers, Hiland, (1904) 1477 Vyse ave., New York, N. Y.
- Flynn, Cornelius P., (1904) 586 Dorchester ave., Boston, Mass.

- Ford, Charles M., (1887) 700 15th st., Denver, Colo.
 Ford, Edgar F., (1902) 335 S. Union ave., Pueblo, Colo.
 Forsyth, William K., (1902) 3100 State st., Chicago, Ill.
 Foster, J. Webb, (1902) 637 Hanover st., Baltimore, Md.
 Foster, John B., (1901) Roseville & 7th aves., Newark, N. J.
 FOUGERA, EDMUND C. H., (1890) 309 8th st., Brooklyn, N. Y.
 Foulke, James, (1881) 107 Monticello ave., Jersey City Heights, N. J.
 Fox, Peter P., (1869) Woodland ave. & 73d st., Philadelphia, Pa.
 Fox, Willard M., (1903) 1492 Cedar ave., Cleveland, O.
 Frailey, William O., (1903) 248-250 E. King st., Lancaster, Pa.
 Frames, J. Fuller, (1890) 601 N. Gay st., Baltimore, Md.
 Franzoni, Joseph D., (1900) 627 Penna. ave. N. W., Washington, D. C.
 Fraser, Horatio N., (1888) 262 5th ave., New York, N. Y.
 Frauer, Herman E., (1881) 246 E. Washington st., Indianapolis, Ind.
 French, Harry B., (1890) 429 Arch st., Philadelphia, Pa.
 French, Rolland H., (1903) care W. S. Merrell Chem. Co., Cincinnati, O.
 Frerichs, Frederick W., (1901) 4608 S. Broadway, St. Louis, Mo.
 Fricke, Frederick G., (1903) Union Block, Plattsmouth, Neb.
 Fricke, Frederick H., (1901) 1637 N. 9th st., St. Louis, Mo.
 Friedenburt, M. W., (1904) 811 Main st., Winfield, Kan.
 FROHWEIN, RICHARD, (1867) 122 1st st., Elizabeth, N. J.
 Frost, Wm. A., (1892) Selby & Western aves., St. Paul, Minn.
 Fry, Herman, (1902) 266 E. North ave., Chicago, Ill.
 Frye, Geo. C., (1879) 320 Congress st., Portland, Me.
 FULLER, OLIVER F., (1869) 220 Randolph st., Chicago, Ill.
 Fulton, Peter MacM., (1902) Gayville, S. Dak.
 Gable, Ralph B., (1902) 51 Maiden Lane, New York, N. Y.
 Gacasser, Theobald T., (1901) Troy, Ind.
 Gahn, Henry, (1902) 378 Washington st., New York, N. Y.
 Gale, Edwin O., (1857) 85 S. Clark st., Chicago, Ill.
 Gale, William H., (1857) 82 S. Clark st., Chicago, Ill.
 Gallagher, John C., (1893) 466 Grove st., Jersey City, N. J.
 Gallenkamp, Edward W., (1903) 212 Main st., Washington, Mo.
 Gamble, Stewart, (1897) 301 Hennepin ave., Minneapolis, Minn.
 Gamer, Albert C. C., (1902) P. O. Box 772, Tacoma, Wash.
 Gane, Eustace H., (1895) 91 Fulton st., New York, N. Y.
 Gann, Henry, (1903) 1611 2d ave., Columbus, Ga.
 Gano, William H., (1892) 1634 Columbia ave., Philadelphia, Pa.
 Gape, Arthur G., (1904) Chardon, O.
 Garber, Elmer F. W., (1901) 31 E. Main st., Mount Joy, Lanc. Co., Pa.
 GARDNER, ROBERT W., (1867) 156 William st., New York, N. Y.
 Garrett, Oscar N., (1902) 110 N. High st., Hillsboro, O.
 Gaus, Charles H., (1879) 202 Washington ave., Albany, N. Y.
 Gausby, Robt. A., (1904) 18 Woodlawn ave., East Cleveland, O.
 Gayle, John W., (1891) cor. Ann st. & Broadway, Frankfort, Ky.
 Geary, Richard T., (1904) Front st., Sarnia, Ont., Can.
 Geisler, Joseph F., (1889) 6 Harrison st., New York, N. Y.
 Geisler, Leo W., Jr., (1904) 915 Amsterdam ave., New York, N. Y.
 GEORGE, CHARLES T., (1873) 1306 N. 3d st., Harrisburg, Pa.
 Geasner, Emil A., (1878) 301 Chapel st., New Haven, Conn.
 Gettel, J. Ralph E., (1902) 4701 5th ave., East End, Pittsburg, Pa.
 Gibbard, George E., (1902) 287 King st. W., Toronto, Can.

- Gibson, Frank L., (1904)
Honolulu, Hawaii.
- Gilbert, Robert B., (1902)
Greenville, Ga.
- Gilpin, Henry B., (1889)
300-302 W. Lombard st., Baltimore, Md.
- Glass, Wm. F., (1904)
Hughes Springs, Tex.
- Gleason, Patrick S., (1904)
Pine & Elm sts., Waltham, Mass.
- Gleghorn, James S., (1900)
1027 Morrison ave., Allegheny, Pa.
- Glick, Harry E., (1900)
526 N. 9th st., Lafayette, Ind.
- Glover, William H., (1891)
293 Essex st., Lawrence, Mass.
- Godbold, Fabius C., (1887)
2728 Prytania st., New Orleans, La.
- Godding, John G., (1875)
278 Dartmouth st., Boston, Mass.
- Goldmann, Oscar, (1900)
2126 3d ave., New York, N. Y.
- Goldsborough, Charles H., (1898)
Culpepper, Va.
- GOOD, JAMES M., (1871)
2348 Olive st., St. Louis, Mo.
- Goodale, Harvey G., (1879)
P. O. Box 2, Jamaica, Queens Co., N. Y.
- Goodman, John H., (1904)
Fitzgerald, Ga.
- Goodwin, William W.*, (1853)
Newburyport, Mass.
- Gordin, Harry M., (1899)
380 Chestnut st., Chicago, Ill.
- Gordon, Frederick T., (1900)
Bureau Med.&Surg., Navy Dept., Wash., D.C.
- Gordon, Jean (Miss), (1902)
31 Washington st., Chicago, Ill.
- Gordon, William F. M.*, (1854)
710 Plum st., Cincinnati, O.
- Gorgas, George A., (1884)
16 N. Third st., Harrisburg, Pa.
- Grace, Wm. D., (1896)
14 Market Square, Portsmouth, N. H.
- Graf, Carl A., (1901)
120 N. Santa Fe ave., Salina, Kan.
- Graham, Willard, (1902)
4304 Walnut st., Philadelphia, Pa.
- Grassly, Charles W., (1884)
287 W. 12th st., Chicago, Ill.
- Grael, Otto H., (1903)
Norfolk, Neb.
- Gray, Margaret McC. (Mrs.), (1901)
326 Park ave., Chicago, Ill.
- Gray, William, (1892)
833 W. Lake st., Chicago, Ill.
- Grazer, Fred. A., (1904)
2159 Mission st., San Francisco, Cal.
- Green, Benjamin, (1888)
12 Market Square, Portsmouth, N. H.
- Greene, William R., (1883)
1 Westminster st., Providence, R. I.
- Greensfelder, Harry, (1904)
Clayton, St. Louis Co., Mo.
- Greenthal, Julius, (1903)
1174 Michigan ave., Detroit, Mich.
- Gregorius, George, (1898)
369 8th ave., New York, N. Y.
- Gregory, Chas. A., (1904)
Council Grove, Kan.
- Gregory, Willis G., (1886)
530 Main st., Buffalo, N. Y.
- Greule, Albert M., (1903)
cor. 4th & Overton sts., Newport, Ky.
- Grew, Louis F., (1901)
1628 S. Grand ave., St. Louis, Mo.
- Greyer, Julius, (1880)
Vine & Findlay sts., Cincinnati, O.
- Griffith, Chas., (1900)
501 Main st., Johnstown, Pa.
- Griffiths, Jcseph, (1901)
33rd st. & Woodland ave., Kansas City, Mo.
- Gross, Chas. E., (1900)
14th & Park sts. N. W., Washington, D. C.
- Gross, Edward Z., (1883)
119 Market st., Harrisburg, Pa.
- Gross, William O., (1901)
Washington & Barr sts., Ft. Wayne, Ind.
- Grossjohann, Ernst, (1900)
Hospital Corps, U. S. A., Manila, P. I.
- GROSSKLAUS, JOHN F., (1859)
High st., & Public Square, Navarre, O.
- Groves, Henry C., (1903)
68 W. Broadway, Ocala, Fla.
- Guerin, James F., (1898)
236 Front st., Worcester, Mass.
- Guerrero, Leon M., (1904)
37 Nueva st., Ermita, Manila, P. I.
- Guidry, Ambrose J., (1903)
care of Finlay, Dicks & Co., New Orleans, La.
- Gundrum, George, (1882)
329 W. Main st., Ionia, Mich.
- Haake, William H., (1893)
795 Central ave., Cleveland, O.

- Haddad, Saleem F., (1902)
89 Broad st., New York, N. Y.
- Haffner, Jean C., (1901)
2846 Market st., St. Louis, Mo.
- Hagans, Daniel A., (1903)
2 Front st., Monroe, Mich.
- Hagee, William P., (1901)
101 N. Main st., St. Louis, Mo.
- Hahn, Charles W. J. H., (1901)
2300 Salisbury st., St. Louis, Mo.
- Haines, Walter S., (1902)
Augusta Arsenal, Augusta, Ga.
- Haley, John B., (1902)
50 E. Washington st., New Castle, Pa.
- Hall, Alden T., (1902)
362 St. Peter st., St. Paul, Minn.
- Hall, Alex., (1904)
1 E. Main st., Lexington, Ky.
- Hall, Edwin B., (1879)
173 Main st., Wellsville, Allegheny Co., N. Y.
- Hall, Joseph P., (1900)
17 Washington Sq., Suffolk, Va.
- Hall, Lincoln G., (1902)
Coggon, Ia.
- Hall, William A., (1888)
177 Griswold st., Detroit, Mich.
- Hallberg, Carl S. N., (1879)
355 Dearborn st., Chicago, Ill.
- Halstead, Alice L. (Mrs.), (1892)
1101 E. Front st., Muscatine, Ia.
- Hamilton, Clarence B., (1903)
Longview, Tex.
- Hamilton, William C., (1902)
910 Main st., Bridgeport, Conn.
- Hammar, Alrick, (1897)
Pharmacist, U. S. Navy, Mare Island, Cal.
- Hance, Anthony M., (1902)
623 Callowhill st., Philadelphia, Pa.
- HANCE, EDWARD H., (1857)
Callowhill & Marshall sts., Phila., Pa.
- HANCOCK, CHAS. W., (1868)
P. O. Box 55, Langhorne, Pa.
- HANCOCK, JOHN F., (1863)
4 S. Howard st., Baltimore, Md.
- Haney, Thomas C., (1903)
102 E. Schiller st., Columbus, O.
- Hankey, William T., (1902)
111 Water st., Cleveland, O.
- Hannan, Owen B., (1893)
74 Frankford st., Cleveland, O.
- Hanrath, Fred. R., (1904)
U. S. M. Hosp., St. Louis, Mo.
- Harbaugh, Duncan J., (1902)
Haverford, Montgomery Co., Pa.
- Harbaugh, Wilson L., (1896)
Haverford, Montgomery Co., Pa.
- Hardin, John H., (1881)
226 S. Front st., Wilmington, N. C.
- Hardman, Lamartine G., (1903)
Harmony Grove, Ga.
- Hargreaves, John, (1904)
162 Queen st. W., Toronto, Ont., Can.
- HARLOW, NOAH S., (1859)
4 Smith's Block, Bangor, Me.
- Harper, Chas. B., (1904)
59 S. Howard st., Akron, O.
- Harper, Harry L., (1903)
520 Court st., Beatrice, Neb.
- Harrington, Frank, (1869)
Main & Market sts., Logan, O.
- Harris, Francis M., (1894)
6 Downing st., Worcester, Mass.
- Harris, Norman B., (1904)
50 W. Broadway, New York, N. Y.
- Harrison, Robert L., (1902)
607 Louisiana st., Richmond, Va.
- Harrison, William J., (1896)
Main st. & Clifton ave., Lakewood, N. J.
- Harter, Isaac F., (1893)
Stronghurst, Ill.
- Hartigan, Joseph D., (1902)
1299 Main st., Bridgeport, Conn.
- Harting, Rudolph R., (1902)
Short & Mill sts., Lexington, Ky.
- Hartwig, Otto J., (1892)
1570 Milwaukee ave., Chicago, Ill.
- Hartz, Johann D. A., (1902)
137 13th st., College Point, N. Y.
- Harvey, George A., (1903)
cor. 7th & Victory sts., Little Rock, Ark.
- Hassinger, Samuel E. R., (1880)
1 airmount ave. & 23d st., Philadelphia, Pa.
- Hatton, Edgar M., (1878)
Hotel Vendome, Capitol Sq., Columbus, O.
- Hatton, Ellmore W., (1894)
90 N. High st., Columbus, O.
- Hauenstein, William, (1883)
375 Amsterdam ave., New York, N. Y.
- Hausmann, Frederick W., (1895)
1627 N. 8th st., Philadelphia, Pa.
- Havenhill, L. D., (1900)
1133 Kentucky st., Lawrence, Kan.
- Hay, Chas. L., (1898)
209 E. Du Bois ave., Du Bois, Pa.

- Hay, Edward A., (1889)
Middle & Free sts., Portland, Me.
- Haydock, Mabelle (Miss), (1902)
2516 N. 32d st., Philadelphia, Pa.
- Hayes, Horace P., (1880)
312 Elk st., Buffalo, N. Y.
- Haynes, David O., (1887)
90 William st., New York, N. Y.
- Hays, Francis B., (1902)
100 William st., New York, N. Y.
- Hazard, Elmer C., (1902)
Shrewsbury, N. J.
- Hazlett, James L., (1900)
Hearne, Robertson Co., Tex.
- Heath, George M., (1903)
Big Rapids, Mich.
- Hechler, Edward H., (1904)
1099 Broadway, Cleveland, O.
- Heebner, Charles F., (1894)
Ontario Coll. Pharm., Toronto, Can.
- Heim, Henry, (1900)
James & 3d sts., Saginaw, E. S., Mich.
- Heim, William J., (1902)
1454 N. 10th st., Philadelphia, Pa.
- Heintsb, Sigmund W., (1889)
16 E. King st., Lancaster, Pa.
- Heinritz, Lebrecht G., (1902)
128 South st., Holyoke, Mass.
- Heintzelman, Joseph A., (1858)
Ridge & College aves., Philadelphia, Pa.
- Helfman, Joseph, (1894)
322 Field ave., Detroit, Mich.
- Hemm, Francis, (1881)
Grand ave. & Arsenal st., St. Louis, Mo.
- Hemm, Louis P., (1894)
Webster & Jefferson aves., Kirkwood, Mo.
- Hengst, J. Edwin, (1900)
Gay st. & Central ave., Baltimore, Md.
- Henkel, Alice (Miss), (1902)
1737 U st. N. W., Washington, D. C.
- Henkel, Charles B., (1902)
Md. ave. & Prince George st., Annapolis, Md.
- Henrion, Walter S., (1904)
501 N. Main st., Wichita, Kan.
- Henry, Charles (Dworniczak), (1881)
Croton-on-Hudson, N. Y.
- Henry, Frank C., (1894)
703 15th st., N. W., Washington, D. C.
- Henry, W. P., (1903)
819 Wal st., Des Moines, Ia.
- Hepburn, John, (1873)
103 Main st., Flushing, N. Y.
- Herb, Joseph, (1903)
528 Tower ave., Superior, Wis.
- Herbat, William P., (1895)
2500 Penna. ave. N. W., Washington, D. C.
- Hereth, Frank S., (1893)
314 Belden ave., Chicago, Ill.
- Hermanek, Joseph C., (1904)
585 Centre ave., Chicago, Ill.
- Herold, Lodimir, (1903)
1663 Broadway, Cleveland, O.
- Hess, Paul L., (1892)
Independence & Forest avs., Kansas City, Mo.
- Heuisler, Philip I., (1903)
308-310 W. Lombard st., Baltimore, Md.
- HEYDENREICH, EMILE, (1867)
30 N. William st., New York, N. Y.
- Heyl, James B., (1863)
Vice-Consul, Hamilton, Bermuda.
- Hickerson, William H., (1894)
Warren, Huntingdon Co., Ind.
- Higgins, Edward A., (1903)
6th st. & Grand ave., Des Moines, Ia.
- High, Raymond L., (1902)
Box 234, Worcester, Mass.
- Hilton, Samuel L., (1890)
1033 22d st. N. W., Washington, D. C.
- Hinrichs, Gustavus D., (1895)
4106 Shenandoah ave., St. Louis, Mo.
- Hiriart, Sebastian, (1891)
Bank & Plaquemine sts., Plaquemine, La.
- Hitchcock, George H., (1902)
1031 6th ave., New York, N. Y.
- Hitchcock, John E., (1892)
Custom House Sq., Plattsburg, N. Y.
- Hoch, Aquila, (1896)
543 E. Thompson st., Philadelphia, Pa.
- Hodgkinson, Albert E., (1903)
319-321 Kelly ave., Devil's Lake, N. Dak.
- Hodgson, Joseph A., (1903)
196 Whalley ave., New Haven, Conn.
- Hoffman, George F., (1902)
Pesotum, Ill.
- Hoffmann, Geo. W., (1904)
321 Fourth st., Logansport, Ind.
- Hoffmann, Herman, (1902)
1019 Congress ave., Houston, Tex.
- Hogan, John J., (1890)
90 Meadow st., New Haven, Conn.
- Hoge, John S., (1903)
562 Cherry st., Macon, Ga.
- Hollander, Joseph M., (1901)
915 Braddock ave., Braddock, Pa.

Holliday, Francis E.,	(1900)	Husted, Alfred B.,	(1879)
523 Kansas ave., Topeka, Kan.		77 Eagle st., Albany, N. Y.	
HOLMES, CLAY W.,	(1873)	Hughes, Francis S.,	(1902)
410 W. Gray st., Elmira, N. Y.		15th & Oxford sts., Philadelphia, Pa.	
Holmes, Henry E.,	(1880)	Hummel, John A.,	(1901)
Seattle, Wash.		New Madrid, New Madrid Co., Mo.	
Holsendorf, Benjamin E.,	(1902)	Hunt, Reid,	(1904)
Residence Unknown.		Hyg.Lab., P.H. & M. H. S., Washington, D.C.	
Holt, Edwin M.,	(1902)	Huntley, Clyde G.,	(1904)
P. H. & M. H. Service, Washington, D. C.		Oregon City, Ore.	
HOLZHAUER, CHARLES,	(1873)	Hurd, John C.,	(1892)
787 Broad st., Newark, N. J.		26 Market st., Somersworth, N. H.	
Hood, Charles I.,	(1871)	Hurlebaus, George W.,	(1895)
Merrimac & Central sts., Lowell, Mass.		2030 14th st. N. W., Washington, D. C.	
Hood, Reuben C.,	(1902)	Hurty, John N.,	(1882)
431 Marietta st., Atlanta, Ga.		104 N. Penn st., Indianapolis, Ind.	
Hope, Robert L.,	(1901)	Huston, Thos. B.,	(1904)
Centralia, Mo.		1833 Adams st., Toledo, O.	
Hopkins, Jesse L.,	(1898)	Hynson, Henry P.,	(1890)
Woodbridge Bldg., New York, N. Y.		423 N. Charles st., Baltimore, Md.	
Hopkins, Zerah B.,	(1900)	Ilhardt, William K.,	(1901)
Brandon, Vt.		4836 Delmar Boulevard, St. Louis, Mo.	
Hopp, Lewis C.,	(1876)	Ink, Charles E.,	(1885)
256 Euclid ave., Cleveland, O.		Columbiana, O.	
Hopping, Charles E.,	(1903)	Irvine, Darwin W.,	(1902)
Beaver City, Neb.		care Smith Drug Co., Salt Lake City, Utah.	
Horlick, Alex. J.,	(1904)	Itizarri Pino, Miguel,	(1903)
Horlick Food Co., Racine, Wis.		Cosmopolit'n Drug Co., Ybor City, Tampa, Fla.	
Horn, Wilbur F.,	(1876)	Ittner, William F.,	(1903)
32 West Main st., Carlisle, Pa.		2301 S. Grand ave., St. Louis, Mo.	
Horne, Warren W.,	(1902)	Jackman, Wilbur F.,	(1899)
23 Hay st., Fayetteville, N. C.		Orono, Me.	
Houghton, E. Mark,	(1899)	Jackson, Frank A.,	(1900)
130 Longfellow ave., Detroit, Mich.		90 Main st., Woonsocket, R. I.	
Hover, William A.,	(1895)	Jacobs, Charles C.,	(1901)
1437 Lawrence st., Denver, Colo.		Constancia, Cienfuegos, Cuba.	
Howard, Fletcher,	(1895)	JACQUES, GEORGE W.,	(1869)
Des Moines, Ia.		Broadway & Augusta sts., S. Amboy, N. J.	
Howe, J. Wm.,	(1904)	James, Frank L.,	(1901)
30 High st., Hamilton, O.		St. Louis, Mo.	
Howell, Edward V.,	(1900)	Jamieson, George A.,	(1903)
Chapel Hill, N. C.		816 North ave., Bridgeport, Conn.	
Howson, Arthur B.,	(1886)	JAMIESON, THOMAS N.,	(1903)
Paint & Main sts., Chillicothe, O.		4508 Woodlawn ave., Chicago, Ill.	
Hoyt, Geo. M.,	(1904)	Janssen, Jacob S.,	(1903)
775 Broad st., East Weymouth, Mass.		Milwaukee & Wisconsin sts., Milwaukee, Wis.	
Huder, Henry J.,	(1894)	Jeffers, Clyde N.,	(1903)
52 E. Washington st., Indianapolis, Ind.		Yukon, Okla. Terr.	
Hudnut, Richard A.,	(1899)	Jelliffe, Smith E.,	(1895)
44 E. 19th st., New York, N. Y.		231 W. 71st st., New York, N. Y.	
Hudson, Arthur,	(1882)	Jesson, Jacob,	(1872)
Centre st., Newton, Mass.		Euclid ave., Ontario, Cal.	

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|---|--------|---|--------|
| Joergensen, Sophus, | (1889) | Katz, Otto, | (1904) |
| Commercial st., LaConner, Skagit Co., Wash. | | Vine & Liberty sts., Cincinnati, O. | |
| Johns, William G., | (1902) | Kauffman, George B., | (1882) |
| 103 Worley st., Cleveland, O. | | 235 N. High st., Columbus, O. | |
| Johnson, Ambrose, | (1903) | Keaney, James J., | (1899) |
| Jacksonville, Tex. | | Charles & West sts., Malden, Mass. | |
| Johnson, Charles W., | (1903) | Kebler, Lyman F., | (1894) |
| Lock Box 114, University Sta., Seattle, Wash. | | Bureau of Chemistry, Washington, D. C. | |
| Johnson, Fletcher V., | (1903) | Keenan, Thomas J., | (1894) |
| 3647 Russell ave., St. Louis, Mo. | | 66 W. Broadway, New York, N. Y. | |
| Johnson, Ralph H., | (1901) | Kemp, Edward, | (1903) |
| Monongahela & Duquesne aves, Swissvale, Pa. | | 135 Water st., New York, N. Y. | |
| Jones, Alexander H., | (1874) | Kendall, John L., | (1903) |
| 9th & Parrish sts., Philadelphia, Pa. | | Omaha Coll. Pharm., Omaha, Neb. | |
| Jones, David F., | (1895) | Kendall, Wallace W., | (1903) |
| 106 Granite Block, Watertown, S. Dak. | | Superior, Neb. | |
| Jones, James T., | (1875) | Kennedy, Ezra J., | (1887) |
| 855 E. 4th st., South Boston, Mass. | | 90 William st., New York, N. Y. | |
| Jones, Oscar W., | (1902) | Kent, Henry A., Jr., | (1880) |
| 27 Court st., Auburn, Me. | | E. Broad st. & Jefferson ave., Elizabeth, N. J. | |
| Jones, Philip M., | (1903) | Kent, Robert R., | (1855) |
| 31 Post st., San Francisco, Cal. | | 220 W. 70th st., New York, N. Y. | |
| Jones, Simon N., | (1870) | Kephart, Philip, | (1902) |
| 1st & Jefferson sts., Louisville, Ky. | | Berrien Springs, Mich. | |
| Jones, William D., | (1903) | Keppler, Christian L., | (1882) |
| 107 E. Bay st., Jacksonville, Fla. | | 461 Dryades st., New Orleans, La. | |
| Jorden, Henry A., | (1902) | Kerr, William W., | (1887) |
| 56 E. Commerce st., Bridgeton, N. J. | | Fullerton, Orange Co., Cal. | |
| Jorgenson, Edward B., | (1902) | Kester, Joseph A., | (1904) |
| 702 Washington st., San Francisco, Cal. | | Onaga, Kan. | |
| Jorgenson, Hans C., | (1899) | Kettler, Edward, Jr., | (1896) |
| Navy Yard, Washington, D. C. | | Farwell ave. & Brady st., Milwaukee, Wis. | |
| Judd, Albert F., | (1901) | Kiedaisch, George A., | (1904) |
| Pittsburg Coll. Pharm., Pittsburg, Pa. | | 422 Main st., Keokuk, Ia. | |
| Judge, Charles R., | (1901) | Killeen, Wm. P., | (1904) |
| 515 Olive st., St. Louis, Mo. | | 800 Washington ave., New Orleans, La. | |
| Junger, William F. F., | (1902) | Kilmer, Frederick B., | (1886) |
| 123 Broad st., Reinbeck, Ia. | | 147 College ave., New Brunswick, N. J. | |
| Jungmann, Julius, | (1879) | King, Ferdinand H., | (1901) |
| 1020 3d ave., New York, N. Y. | | 205 Main st., Delphos, O. | |
| Kaemmerer, Wm. F., | (1899) | King, George A. N., | (1892) |
| 410 S. 6th st., Columbus, O. | | First ave. N. & 3d st., Minneapolis, Minn. | |
| Kahn, Harry, | (1903) | KING, JAMES T., | (1859) |
| 4705 Indiana ave., Chicago, Ill. | | Main & South sts., Middletown, N. Y. | |
| Kalish, Julius, | (1875) | King, Robert B., | (1901) |
| 383 Grand st., New York, N. Y. | | Helena, Ark. | |
| Kalish, Oscar G., | (1900) | Kingman, Ignatius, | (1904) |
| 23d st. & 4th ave., New York, N. Y. | | East Grand Forks, Minn. | |
| Kalusowski, Henry E., | (1904) | Kinney, Charles N., | (1901) |
| 808 I st. N. W., Washington, D. C. | | 3002 University ave., Des Moines, Ia. | |
| Katz, Gustave, | (1903) | Kinnison, Virgil A., | (1904) |
| 2139 St. Charles ave., New Orleans, La. | | Welch, Ind. Ter. | |

Kirchgasser, Wm. C., 74 Laight st., New York, N. Y.	(1888)	Kornmann, Henry, 831 Harlem ave., Baltimore, Md.	(1899)
Kirchgeassner, Wm. C., 1115 3rd ave., cor. Merrick, Detroit, Mich.	(1903)	Kosminsky, Leonce J., University of Maryland, Baltimore, Md.	(1902)
Kirk, James E., 1245 Main st., Jacksonville, Fla.	(1903)	KRAEMER, HENRY, 424 S. 44th st., Philadelphia, Pa.	(1892)
Kirkland, Derwentwater, 320 S. Spring st., Los Angeles, Cal.	(1889)	Kremba, Ernest M., 420 11th ave., Milwaukee, Wis.	(1903)
Klein, Ernest F., 218 Central ave., Hot Springs, Ark.	(1894)	Kremers, Edward, University of Wisconsin, Madison, Wis.	(1887)
Kleine, Oscar C., Jr., 110 Hamburg ave., Brooklyn, N. Y.	(1903)	Krewson, William E., 1830 N. Franklin st., Philadelphia, Pa.	(1875)
Kleinschmidt, Augustus A., 101 S. 4th st., St. Louis, Mo.	(1903)	Krueger, Owen W., 5th & Broadway, Kansas City, Mo.	(1897)
Klie, Carl G. E., 5100 N. Broadway, St. Louis, Mo.	(1903)	Kuder, William F., 342 Jennings ave., Cleveland, O.	(1893)
Klie, G. H. Charles, 5100 N. Broadway, St. Louis, Mo.	(1878)	Kuehne, Charles, 571 Central ave., Jersey City Heights, N. J.	(1902)
Kline, Clarence M., 266 W. Tulpehocken st., Germant'n, Phila., Pa.	(1902)	Kurtz, Irving W., Boonville, Mo.	(1904)
Kline, Mahlon N., 427 Arch st., Phila., Pa.	(1878)	Kutchbauch, John F., 1707 Blue Rock st., Cincinnati, O.	(1904)
Klor, Alex. E. G., 2601 Washington ave., Newport News, Va.	(1899)	La Pierre, Elie H., 96 River st., Cambridgeport, Mass.	(1892)
Kloster, Benjamin J., 329 4th st., Sioux City, Ia.	(1902)	La Wall, Charles H., 14 S. 43d st., Philadelpia, Pa.	(1896)
KLUSSMANN, HERMANN, 110 First st., Hoboken, N. J.	(1876)	Lachance, Seraphin, 1538 St. Katharine st., Montreal, Can.	(1888)
Knabe, Gustavus A., Court Sq. & Dexter ave., Montgomery, Ala.	(1876)	Laird, John, Springdale, Washington Co., Ark.	(1895)
Knight, William C., P. O. Box 819, Carrollton, Mo.	(1900)	Lamar, Henry J., 519 Forsyth st., Vineville, Macon, Ga.	(1897)
Knoebel, Thomas, 209 Collinsville ave., East St. Louis, Ill.	(1892)	Lamar, William R., Mallinckrodt Chem. Works, St. Louis, Mo.	(1901)
Knoefel, Bruno, 1419 E. Spring st., New Albany, Ind.	(1896)	Lamont, William H., 11 S. 4th st., St. Louis, Mo.	(1903)
Knoefel, Charles D., 110 E. Market st., New Albany, Ind.	(1894)	Lampa, Robert R., 120 William st., New York, N. Y.	(1892)
Knox, James W. T., 99 Webb ave., Detroit, Mich.	(1898)	LAND, ROBERT H., 812 Broad st., Augusta, Ga.	(1859)
Koch, August F., Amana, Ia.	(1903)	Land, Robert H., Jr., 1134 Broad st., Augusta, Ga.	(1902)
Koch, Julius A., Bluff & Pride sts., Pittsburg, Pa.	(1892)	Lanning, Adrian R., 436 Grant st., Dennison, O.	(1904)
Koch, Louis, 329 N. 4th st., Philadelphia, Pa.	(1872)	Larsen, John T., Chartres & St. Ferdinand sts., New Orleans, La.	(1904)
Koelle, Otto C., 518 Wall st., Sioux City, Ia.	(1902)	Lascoff, I. Leon, Lexington ave. & 83d st., New York, N. Y.	(1903)
Koeneke, Charles H., 6821 Manchester ave., St. Louis, Mo.	(1901)	Laue, John M. A., 175 3d st., Portland, Ore.	(1904)
Kolsch, Julius, 202 Harrison ave., Leadville, Colo.	(1902)	Lauer, Joseph W., 229 E. Third st., Winona, Minn.	(1904)

Lauricella, Felice,	(1896)	Lindly, John M.,	(1901)
275 Hanover st., Boston, Mass.		Winfield, Henry Co., Ia.	
Lawson, Charles E.,	(1903)	Lindvall, Gus,	(1897)
1714 Holly st., Kansas City, Mo.		15th st. & 5th ave., Moline, Ill.	
Le Richeux, Alfred G.,	(1901)	LEWELLYN, JOHN F.,	(1867)
405 E. 4th st., Duluth, Minn.		Public Square, Mexico, Audrain Co., Mo.	
LEE, JAMES A.,	(1856)	LLOYD, JOHN URI,	(1870)
Main st., New Iberia, La.		Court & Plum sts., Cincinnati, O.	
Lee, Richard H.,	(1904)	Lo Sardo, Antonino,	(1902)
9th st. & Brooklyn ave., Kansas City, Mo.		123 Navy st., Brooklyn, N. Y.	
Leeb, Theodore F.,	(1903)	Loehr, Theodore C.,	(1888)
501 W. 5th st., Winona, Minn.		Carlinville, Macoupin Co., Ill.	
Leedom, Charles,	(1902)	Lohmann, Herman J.,	(1896)
1403 Filbert st., Philadelphia, Pa.		90 Monticello ave., Jersey City, N. J.	
Legel, John G.,	(1897)	Lohmann, John,	(1904)
Charles City, Ia.		Main st., Edwardsdale, Pa.	
Legendre, Joseph A.,	(1891)	Loomis, John C.,	(1876)
124 Baronne st., New Orleans, La.		Chestnut & Watt sts., Jeffersonville, Ind.	
Lehr, Philip,	(1885)	Lord, Thomas,	(1882)
1145 Lorain st., Cleveland, O.		233 Randolph st., Chicago, Ill.	
Lehritter, George P.,	(1902)	Louis, Henry,	(1902)
Freehold, N. J.		Dubuque & Washington sts., Iowa City, Ia.	
Leiper, Jas. A., Jr.,	(1904)	Lovia, Henry C.,	(1892)
Sewanee, Tenn.		2137 7th ave., New York, N. Y.	
LEIS, GEORGE,	(1869)	Lovvorn, James L.,	(1897)
747 Massachusetts st., Lawrence, Kan.		Bowdon, Ga.	
LEMBERGER, JOSEPH L.,	(1858)	Lowd, John C.,	(1871)
5 N. Ninth st., Lebanon, Pa.		43 Temple Place, Boston, Mass.	
Leonard, Alexander R.,	(1904)	Lowe, Clement B.,	(1895)
Stonewall, Manitoba, Can.		Phil-Ellena st. & Germant'n ave., Phila., Pa.	
Leslie, William A.,	(1902)	Lowell, Edward M.,	(1896)
Morganton, N. C.		12 High st., Lewiston, Me.	
Lester, Leon T.,	(1903)	Ludwig, Wm. E.,	(1904)
902 N. Garrison ave., St. Louis, Mo.		1344 Dorr st., Toledo, O.	
Leverty, John A.,	(1900)	Lueder, Fritz,	(1894)
1655 Main st., Bridgeport, Conn.		509 S. Adams st., Peoria, Ill.	
Levinson, Joseph,	(1895)	Lunney, William J.,	(1902)
11 Main st., Napa, Cal.		Seneca, S. C.	
Levy, Adolph,	(1877)	Lutterman, Louis A.,	(1904)
996 Broadway, Brooklyn, N. Y.		Sycamore & Liberty sts., Cincinnati, O.	
Levy, William M.,	(1894)	Luve, Frank A. A.,	(1902)
1382 Magazine st., New Orleans, La.		Army General Hospital, Washington, D. C.	
Lewis, Ernest G.,	(1892)	Lyford, Earl H.,	(1903)
701 Centre st., Jamaica Plain, Mass.		Main & Mechanic sts., Berlin, N. H.	
Lichthardt, George H. P.,	(1902)	Lyon, Arthur G.,	(1903)
1800 M st., Sacramento, Cal.		Coldwater, Mich.	
Liersch, Clemens,	(1903)	Lyon, George C.,	(1899)
307 Walnut st., Kansas City, Mo.		225 Westminster st., Providence, R. I.	
Lillie, Forss B.,	(1900)	Lyons, Albert B.,	(1885)
204 Harrison ave., Guthrie, Okla. Ter.		72 Brainard st., Detroit, Mich.	
Lilly, Josiah K.,	(1890)	Lyons, Lucien E.,	(1904)
Indianapolis, Ind.		Camp & Gravier sts., New Orleans, La.	

- Maass, William F., (1903)
2683 Atlantic ave., Brooklyn, N. Y.
- Macdowell, Wm. F., (1904)
U. S. P. H. & M. H. S., Ellis Island, N. Y.
- McFadden, Warren L., (1902)
care Parke, Davis & Co., Detroit, Mich.
- MacRae, John Y., (1894)
P. O. Box 66, Norfolk, Va.
- Mack, George C., (1902)
Bristol, S. Dak.
- Macnair, Whitmel H., (1898)
Main st., Tarboro, N. C.
- Macy, Sherman R., (1891)
Highland Park Normal Coll., Des Moines, Ia.
- Magruder, Chas. G., (1904)
4138 Magazine Hill, New Orleans, La.
- Maguire, Edward S., (1897)
P. H. & M. H. Service, Mobile, Ala.
- MAIN, THOMAS F., (1872)
44 Hudson st., New York, N. Y.
- Maisch, Henry, (1898)
711 Edmondson ave., Baltimore, Md.
- Major, John R., (1893)
800 7th st., Washington, D. C.
- Mallinckrodt, Edward, (1869)
Mallinckrodt & Main sts., St. Louis, Mo.
- Mann, Charles F., (1903)
900 Woodward ave., Detroit, Mich.
- Mansfield, Samuel, (1898)
1001 W. Baltimore st., Baltimore, Md.
- Mares, Ferdinand L., (1897)
20th & Pierce sts., Omaha, Neb.
- Mares, Frank M., (1902)
2876 Archer ave., Chicago, Ill.
- Mariamson, Max, (1902)
165th st. & Caldwell ave., New York, N. Y.
- Marion, Etienne J., (1903)
4239 St. Charles ave., New Orleans, La.
- Markoe, George B., (1897)
40 Rockview st., Jamaica Plain, Mass.
- Martin, James, (1903)
Reyno, Ark.
- Martin, John C., (1883)
U. S. Nav. Dispensary, Washington, D. C.
- Martin, Nicholas H., (1891)
Ravenswood L. Fell, Gateshead-on-Tyne, Eng.
- Mason, Harry B., (1896)
P. O. Box 484, Detroit, Mich.
- Mason, Myron R., (1904)
San Fran. Quar. Sta., Angel Island, Cal.
- Matson, Geo. H., Jr., (1869)
662 E. Long st., Columbus, O.
- Matthews, Charles E., (1893)
221 Randolph st., Chicago, Ill.
- Matthews, Loderick, (1903)
West Side Main st., Miami, Ind. Ter.
- Matusow, Harry, (1897)
S. W. cor. 3d st. & Columbia ave., Phila., Pa.
- May, Charles C., (1898)
3341 Lucas ave., St. Louis, Mo.
- May, Edward, (1897)
U. S. Naval Hospital, Norfolk, Va.
- May, Louis, (1902)
5803 Third ave., Brooklyn, N. Y.
- Mayo, Caswell A., (1893)
66 W. Broadway, New York, N. Y.
- Mayo, Frederick W., (1901)
Residence Unknown.
- McAdams, Harry K., (1903)
Main & Upper sts., Lexington, Ky.
- McAleer, Francis A., (1904)
Bokchito, Ind. Ter.
- McArthur, Jas. W., (1904)
2305 Broadway, Spokane, Wash.
- McBride, Chas. R., (1904)
78 Calle Madrid, Manila, P. I.
- McCauley, Charles E., (1903)
103 Marion st., Oak Park, Ill.
- McConnell, Chas. H., (1899)
84 State st., Chicago, Ill.
- McConnell, Lewis W., (1904)
McCook, Neb.
- McCormick, Louis C., (1903)
212 W. DeSoto st., Lake City, Fla.
- McCrary, Walter H., (1903)
Jeffersonville, Ga.
- McElhenie, Thomas D., (1872)
259 Ryerson st., Brooklyn, N. Y.
- McGill, John T., (1900)
Vanderbilt University, Nashville, Tenn.
- McIlravy, Maude J. (Miss), (1903)
Magnolia, O.
- McIntyre, Ewen, (1873)
303 W. 17th st., New York, N. Y.
- McIntyre, Ewen, Jr., (1903)
992 Sixth ave., New York, N. Y.
- McINTYRE, WILLIAM, (1863)
2429 Frankford ave., Philadelphia, Pa.
- McKay, Felix E., (1903)
Duval st., Troupe, Tex.
- McKenzie, Hugh H., (1902)
392 Cedar ave., Cleveland, O.
- McKesson, G. Clinton, (1888)
91 Fulton st., New York, N. Y.

- McKesson, John R., (1867) 91 Fulton st., New York, N. Y.
- McKinney, Robert S., (1898) Taneytown, Md.
- McLarty, Colin, (1898) Navy Yard Dispensary, Norfolk, Va.
- McMahon, Joseph, (1897) 248 Clermont ave., Brooklyn, N. Y.
- McNair, John S., (1902) Ashland, Jackson Co., Ore.
- McPherson, George, (1865) Blue Island, Ill.
- Meissner, Frederick W., Jr., (1890) 820 Main st., La Porte, Ind.
- Mellor, Alfred, (1864) 2130 Mt. Vernon st., Philadelphia, Pa.
- Menk, Charles W., (1898) 106 Market st., Newark, N. J.
- Mente, Alvin W., (1901) 125 E. 3d st., Kansas City, Mo.
- Mentzer, Harvey H., (1902) 245 W. Chelton ave., Germant'n, Phila., Pa.
- Merçer, Wm. E., (1902) Liberty, Ill.
- Meredith, H. Lionel, (1900) 319 Washington st., Hagerstown, Md.
- Merrell, Charles G., (1888) 5th & Butler sts., Cincinnati, O.
- Merrell, George, (1879) 5th & Butler sts., Cincinnati, O.
- Merrell, George R., (1901) 4th & Market sts., St. Louis, Mo.
- Merrell, Hubert S., (1903) N.E. cor. 4th & Market sts., St. Louis, Mo.
- Merrem, Charles D., (1901) 1050 N. Taylor ave., St. Louis, Mo.
- Mertz, Edward L., (1904) 2128 Calhoun st., Fort Wayne, Ind.
- Metz, Abraham L., (1887) Prytania st., New Orleans, La.
- Metzger, Matthias C., (1902) 1915 Washington ave., Cairo, Ill.
- Meyer, Charles L., (1901) 1531 Madison ave., Baltimore, Md.
- MEYER, CHRISTIAN F. G., (1860) 4th st. & Clark ave., St. Louis, Mo.
- Meyer, Martin M., (1897) 118 N. Main st., South Bend, Ind.
- Meyer, Theodore F., (1901) 4th st. & Clark ave., St. Louis, Mo.
- Michaelis, Gustavus, (1882) 1 Myrtle ave., Albany, N. Y.
- Michalek, John, (1900) 1616 Otto Boulevard, Chicago Heights, Ill.
- Michels, Victor C., (1902) W. Side Square, Albion, Ind.
- Mieding, Albert E., (1903) 1701 State st., Milwaukee, Wis.
- Mikkelsen, Niels, (1903) Cherokee, Ia.
- Millard, David R., (1899) 2200 E. Baltimore st., Baltimore, Md.
- MILLER, ADOLPH W., (1868) 3d & Callowhill sts., Philadelphia, Pa.
- Miller, Charles, (1897) Santa Rosa Quarantine, Pensacola, Fla.
- Miller, Chas. E., (1899) Albion, Noble Co., Ind.
- Miller, Emerson R., (1895) Polytechnic Inst., Auburn, Ala.
- Miller, Frederick J., (1902) 430 Cedar st., Cleveland, O.
- Miller, F. William, (1902) Homestead, Ia.
- Miller, Jacob A., (1873) 2d & Chestnut sts., Harrisburg, Pa.
- Miller, T. Ashby, (1894) 509 E. Broad st., Richmond, Va.
- MILLIGAN, DECATUR, (1867) 509 N. 2d st., Philadelphia, Pa.
- Milligan, John D., (1900) 28 Fayette st., Cambridgeport, Mass.
- Miner, Maurice A., (1880) 87 Lake st., Chicago, Ill.
- Miterniler, John A., (1903) 27 La Grange st., Cleveland, O.
- Mittelbach, William, (1891) 114 Main st., Boonville, Mo.
- Mix, Willis L., (1896) 871 Chapel st., New Haven, Conn.
- Moerk, Frank X., (1898) 646 E. Chelton ave., Philadelphia, Pa.
- Moith, Augustus T., (1860) 1 Ferry st., Fishkill, N. Y.
- Molwitz, Ernest, (1867) 2707 8th ave., New York, N. Y.
- Monaghan, Thomas F., (1902) 2630 E. Lehigh ave., Philadelphia, Pa.
- Montgomery, Harriet E. (Miss), (1903) Norton, Kan.
- Montgomery, John S., Jr., (1904) Thomasville, Ga.
- MOORE, JOACHIM B., (1860) 13th & Lombard sts., Philadelphia, Pa.

- Moore, John T., (1888)
932 Rhode Island st., Lawrence, Kan.
- Moore, Silas H., (1880)
525 4th st., Sioux City, Ia.
- Morgan, Aylmer L., (1890)
Washington & Adams sta., Camden, Ark.
- Morgan, Charles, (1899)
1300 N. Caroline st., Baltimore, Md.
- Morris, George A., (1902)
Fort Stanton, N. Mex.
- Morris, Henry M., (1902)
919 Grand River ave., Detroit, Mich.
- MORRIS, LEMUEL I., (1880)
720 N. Broad st., Philadelphia, Pa.
- Morris, Max, (1898)
503 4th st., Macon, Ga.
- Morrison, Joseph E., (1888)
P. O. Box 683, Montreal, Can.
- Morrison, William W., (1902)
117 College st., Iowa City, Ia.
- Morse, Edward W., (1896)
Townly Park, Mt. Vernon, Ill.
- Morse, Frank D., (1902)
50 Deering st., Portland, Me.
- Mosely, Lawrence J., (1903)
703 Franklin st., Tampa, Fla.
- Mosher, William W., (1894)
13 Colony st., Meriden, Conn.
- Motter, Murray G., (1904)
1815 Belmont ave., Washington, D. C.
- Moyer, Lewis N., (1903)
Robeson, Pa.
- Mueller, Adolphus, (1871)
Cherry st., Highland, Ill.
- Mueller, Ambrose, (1894)
Bristol Bldg., Webster Groves, Mo.
- Muench, Wm., (1899)
608 N. Salina st., Syracuse, N. Y.
- Muir, John D., (1903)
73 Monroe st., Grand Rapids, Mich.
- Mulford, Henry K., (1896)
412 S. 13th st., Philadelphia, Pa.
- Murphy, Chas. C., (1904)
Holloway, O.
- Murphy, John S., (1896)
Union Block, Pontiac, Ill.
- Murray, Alexander, (1903)
San Jose de Costa Rica.
- Murray, Benjamin L., (1896)
care Merck & Co., New York, N. Y.
- Muth, George L., (1894)
23-25 S. Charles st., Baltimore, Md.
- Muth, John C., (1898)
23-25 S. Charles st., Baltimore, Md.
- Muth, John S., (1898)
23-25 S. Charles st., Baltimore, Md.
- Mutty, Walter C., (1902)
Main st., Oldtown, Me.
- Myers, Carvoso O., (1904)
315 Mound st., Atchison, Kan.
- Myers, Daniel, (1882)
111 Water st., Cleveland, O.
- Myers, Preston B., (1897)
1523 Farnam st., Omaha, Neb.
- Nagle, Fred. S., (1904)
Horton & Barney, Wilkesbarre, Pa.
- Nattans, Arthur, (1883)
Lexington & Howard sts., Balto., Md.
- Neal, Thos. L., (1904)
Medford, Okla.
- Neeley, Guy M., (1900)
254 11th st. S. E., Washington, D. C.
- Nelson, Burt E., (1902)
Binghamton State Hosp., Binghamton, N.Y.
- Nelson, Edwin H., (1904)
Brooklyn & Lafayette aves., Detroit, Mich.
- Neu, D. Alfred, (1903)
312 Main st., Union Hill, N. J.
- Neuberger, Joseph A., (1904)
50 Solon st., Cleveland, O.
- Neves, George, (1904)
Ellis Island, New York, N. Y.
- Neville, William R., (1901)
915 Colorado st., Austin, Tex.
- NEWMAN, GEORGE A., (1866)
5th & Walnut sta., Louisville, Ky.
- Nichols, Thomas B., (1876)
170 Essex st., Salem, Mass.
- Niece, Frederic E., (1903)
1020 3d ave., New York, N. Y.
- Nielson, John, (1897)
Ortonville, Minn.
- Nipgen, Frank M., (1904)
5th & William sts., Dayton, O.
- Nixon, Charles F., (1900)
Leominster, Mass.
- Noll, Martin J., (1898)
925 Goodfellow ave., St. Louis, Mo.
- Noll, Mathias, (1901)
605 Atchison st., Atchison, Kan.
- Norton, George E., (1895)
223 Putnam ave., Cambridgeport, Mass.
- O'Connell, Charles J., (1903)
care Parke, Davis & Co., Detroit, Mich.

- O'Gorman, Theophilus V., (1897)
U. S. Marine Hospital, New Orleans, La.
- O'Harc, James, (1888)
6 Benefit st., Providence, R. I.
- O'Neil, Henry M., (1879)
888 Columbus ave., New York, N. Y.
- Oertel, Alfred A., (1903)
84 Auburn st., Cleveland, O.
- Oettinger, Albert, (1902)
967 N. 5th st., Philadelphia, Pa.
- Ogier, John M., (1895)
816 Wheeling ave., Cambridge, O.
- Ogier, William R., (1901)
1365 Bryden Road, Columbus, O.
- OHLIGER, LEWIS P., (1871)
23 W. Liberty st., Wooster, O.
- Obliger, Willard, (1903)
51 Hendrie ave., Detroit, Mich.
- Oldberg, Oscar, (1873)
Northwestern Univ. Bldg., Chicago, Ill.
- OLESON, OLAF M., (1877)
Fort Dodge, Ia.
- Oliff, James H.*, (1867)
200 Arlington ave., Plainfield, N. J.
- Oliver, William M., (1875)
132 Broad st., Elizabeth, N. J.
- Orcar, Edwin G., (1904)
Maryville, Mo.
- ORNE, JOEL S., (1859)
493 Main st., Cambridgeport, Mass.
- Ortiz, Miguel A., (1902)
115 Prado st., Havana, Cuba.
- Orton, Ingomar F., (1891)
2113 Market st., Galveston, Tex.
- Osborne, Edward M., (1904)
Lafayette, Ga.
- Osseward, Cornelius, (1897)
708 2d ave., Seattle, Wash.
- Oster, Frank C., (1902)
1261 St. Clair st., Cleveland, O.
- Osterlund, Otto W., (1902)
46th st. & Baltimore ave., Philadelphia, Pa.
- Ottinger, James J., (1876)
20th & Spruce sts., Philadelphia, Pa.
- Otto, Theodor G. E., (1900)
402 Washington st., Columbus, Ind.
- Overton, Burr M., (1903)
2010 First st., Louisville, Ky.
- OWENS, RICHARD J., (1860)
Myrtle ave. & Spencer st., Brooklyn, N. Y.
- Oxford, Albert, (1904)
Main st., Sapulpa, Ind. Ty.
- Oyster, John H., (1904)
Paola, Kan.
- Packard, Franklin H., (1904)
Redfield, S. Dak.
- Paddock, Morris V., (1902)
Union st., St. John, N. B., Can.
- Palmer, J. Dabney, (1902)
Monticello, Fla.
- Parisen, George W., (1892)
Smith & High sts., Perth Amboy, N. J.
- Parker, Frederick M., (1902)
364 Wabasha st., St. Paul, Minn.
- Parmalee, Walter W., (1901)
P. O. Box 336, Lewiston, Me.
- Parramore, Geo. B., (1904)
Eureka, Fla.
- Parsons, John, (1865)
194 31st st., Chicago, Ill.
- Partridge, Frank R., (1895)
Water st., Augusta, Me.
- Patch, Edgar L., (1872)
P. O. Box 639, Stoneham, Mass.
- Patch, James A., (1903)
Syrian Protestant College, Beirut, Syria.
- Patten, Eustis, (1900)
154 W. Main st., Carbondale, Ill.
- Patten, I. Barlett*, (1858)
594 Washington st., Boston, Mass.
- Patterson, Theodore H.*, (1869)
3640 Cottage Grove ave., Chicago, Ill.
- Patton, John F., (1880)
273 W. Market st., York, Pa.
- Pauley, Frank C., (1879)
939 Ailanthus ave., St. Louis, Mo.
- Payne, George F., (1893)
43½ Whitehall st., Atlanta, Ga.
- Peacock, Bertha L. (Mrs.), (1895)
2012 S. 10th st., Philadelphia, Pa.
- Peacock, Josiah C., (1892)
2012 S. 10th st., Philadelphia, Pa.
- Pearce, Howard A., (1894)
370 Elmwood ave., Providence, R. I.
- Pearson, Joseph F., (1897)
U. S. Naval Station, Newport, R. I.
- Pease, Autumn V., (1893)
Fairbury, Neb.
- Peck, George L., (1883)
Hall of Pharmacy, Jamaica, N. Y.
- Peck, Percy S., (1903)
90 Jefferson ave., Grand Rapids, Mich.
- Pennock, Edward, (1898)
65 Fulton st., New York, N. Y.

- Perkins, Benjamin A., (1878)
94 Commercial st., Portland, Me.
- Perkins, C. William, (1892)
1 East Main st., Waterbury, Conn.
- Perkins, John S., (1904)
Box 234, Meridian, Miss.
- Perry, Frederick W. R., (1885)
434 Lafayette ave., Detroit, Mich.
- Peter, Minor C., (1894)
832 Sixth st., Louisville, Ky.
- Peters, Henry A., (1903)
Oconomowoc, Wis.
- Peterson, John N., (1902)
202 Ave. D, Bayonne, N. J.
- Petsche, Bismark Win., (1892)
Arlington Chemical Co., Yonkers, N. Y.
- PETTIT, HENRY M., (1860)
15 S. Main st., Carrollton, Mo.
- Pfaff, Franz, (1899)
29 Gloucester st., Boston, Mass.
- Pfafflin, Henry A., (1892)
Patton ave. & Church st., Asheville, N. C.
- Pfefferle, Eug. A., (1904)
9 N. Minnesota st., New Ulm., Minn.
- Pfluger, Henry C., (1903)
P. O. Box 307, Honolulu, H. I.
- Philibert, Leon D., (1901)
2631 Gamble st., St. Louis, Mo.
- Phillips, Carrie E. (Miss), (1894)
81 Concord ave., Cambridge, Mass.
- Phillips, Thos. N., (1904)
Bur. Med. & Surg., Navy Dept., Wash., D. C.
- Pieck, Edward L., (1887)
cor. 6th & Main sts., Covington, Ky.
- Pierce, Fred, (1903)
care Ballagh & Co., Nevada, Mo.
- Pierce, Horace C., (1904)
Main st., Barton, Vt.
- Pierce, William H., (1879)
316 Shawmut ave., Boston, Mass.
- Pile, Gustavus, (1881)
770 Passayunk ave., Philadelphia, Pa.
- Pilson, Abram O., (1898)
1327 W. Baltimore st., Baltimore, Md.
- Pine, Warren C., (1897)
Riverside, Burlington Co., N. J.
- Pirie, Alfred M., (1903)
Calle Real, Cartago, Costa Rica, A. C.
- Pitt, John R., (1872)
218 Main st., Middletown, Conn.
- Pitts, William B., (1903)
25 E. Cain st., Atlanta, Ga.
- Placak, Harry, (1902)
care Benton, Myers & Co., Cleveland, O.
- Plaut, Albert, (1894)
128 William st., New York, N. Y.
- Polk, Martin L., (1904)
Magnolia st. & Central ave., Laurel, Miss.
- Pond, Raymond H., (1903)
87 Lake st., Chicago, Ill.
- Poole, William E., (1902)
25 State st., Montpelier, Vt.
- Porter, Chilton S., (1882)
Somerset, Pulaski Co., Ky.
- PORTER, HENRY C., (1872)
Main & Pine sta., Towanda, Pa.
- Porter, Martin L., (1904)
Danforth, Me.
- Potts, David G., (1893)
224 Market st., Philadelphia, Pa.
- Powell, William C., (1895)
Snow Hill, Md.
- Powell, William D., (1898)
Excello, Macon Co., Mo.
- POWER, FREDERICK B., (1872)
6 King st., Snow Hill, London, Eng.
- Prall, Delbert E., (1902)
201 Genesee ave., Saginaw, Mich.
- Preissler, Henry W., (1893)
Shelbyville, Ky.
- Preston, Andrew P., (1881)
2 Congress Block, Portsmouth, N. H.
- Price, Charles H., (1882)
226 Essex st., Salem, Mass.
- Price, Joseph, (1888)
226 Essex st., Salem, Mass.
- Pringle, James M., (1902)
977 8th ave., New York, N. Y.
- Printup, Daniel, (1903)
812 Broad st., Augusta, Ga.
- Puckner, William A., (1888)
73 Wells st., Chicago, Ill.
- Punch, William F., (1874)
200 Dauphin st., Mobile, Ala.
- Pursel, Robert C., (1902)
care Wm. S. Merrell Chem. Co., Cincinnati, O.
- Quackinbush, Benjamin F., (1886)
703 Greenwich st., New York, N. Y.
- Quigley, Richard L., (1902)
2036 G st. N. W., Washington, D. C.
- Quin, Frank W., (1902)
1117 S. Franklin st., New Orleans, La.
- Quintanal, Fernandez B. J., (1903)
7th ave. & 14th st., Ybor City, Tampa, Fla.

- Quirk, Edmond C., Jr., (1904)
 128 & 132 Main st., New Iberia, La.
 Raeuber, Edward G., (1900)
 44 Johnson st., Milwaukee, Wis.
 Rains, A. Brown, (1894)
 11 W. 7th st., Columbia, Tenn.
 Ramsaur, David W., (1902)
 201 Lemon st., Palatka, Fla.
 RAMSPERGER, GUSTAVUS, (1860)
 212 E. 18th st., New York, N. Y.
 Rand, Daniel M., (1892)
 472 Cumberland ave., Portland, Me.
 Randall, Frank O., (1893)
 101 N. Main st., Brockton, Mass.
 Rano, Charles O., (1866)
 275 Niagara st., Buffalo, N. Y.
 Rapelye, Charles A., (1876)
 853 Main st., Hartford, Conn.
 Raubenheimer, Otto, (1902)
 1341 Fulton st., Brooklyn, N. Y.
 Rauschenberg, Sidney, (1900)
 29 S. 12th ave., Mt. Vernon, N. Y.
 Rauschkolb, John, (1894)
 251 S. 4th st., Columbus, O.
 Reade, Frank M., (1900)
 307 E. Grace st., Richmond, Va.
 Redsecker, Jacob H., (1881)
 810 Cumberland st., Lebanon, Pa.
 Reed, Willoughby H., (1893)
 Marshall & Astor sts., Norristown, Pa.
 Reeves, Sidney H., (1902)
 Seven Corners, St. Paul, Minn.
 Reidy, Michael, (1894)
 Shiawassee ave., Corunna, Mich.
 Reilly, Robert C., (1901)
 3300 Meramec st., St. Louis, Mo.
 Reimann, George, (1902)
 405 Genesee st., Buffalo, N. Y.
 Remington, John M., (1904)
 22 E. Main st., Shawnee, Okla. Terr.
 Remington, J. Percy, (1901)
 36 Doughty st., Brooklyn, N. Y.
 REMINGTON, JOSEPH P., (1867)
 1832 Pine st., Philadelphia, Pa.
 Renfroe, Harris B., (1904)
 Box 364, Meridian, Miss.
 Reymond, John P., (1903)
 1010 Broadway, Kansas City, Mo.
 Reynolds, Charles E., (1897)
 U.S.R.S. Columbia Navy Y'rd, New York, N. Y.
 Rhode, Rudolph E., (1887)
 504 N. Clark st., Chicago, Ill.
- Rich, W. Pitt, (1902)
 Grove ave., Verona, Essex Co., N. J.
 Richardson, Edwin S., (1902)
 520 N. Washington st., Marshall, Tex.
 Richardson, Horatio S., (1892)
 Main st., Concord, Mass.
 Richardson, Samuel W., (1897)
 3 B st. S. E., Washington, D. C.
 Richardson, Thos. W., (1904)
 7601 Plum st., New Orleans, La.
 Richardson, Willard S., (1900)
 316 4½ st. S. W., Washington, D. C.
 Richtmann, Wm. O., (1904)
 U. S. Dept. Agric., Washington, D. C.
 Riddell, Benjamin F., (1892)
 8 Granite Block, Fall River, Mass.
 Ridgway, Lemuel A., (1882)
 Box 1111, Boone, Ia.
 Ridgway, William F., (1902)
 1101 Atlantic ave., Atlantic City, N. J.
 Riely, Louis S., (1904)
 Corydon, Ind.
 Riess, Herman W., (1903)
 Fort Snelling, Minn.
 Riggio, Joseph, (1903)
 cor. 8th & 17th sts., Tampa, Fla.
 Riley, Cassius M., (1901)
 Alton, Ill.
 Riley, Russell, (1901)
 1400 Olive st., St. Louis, Mo.
 Rittenhouse, Henry N., (1857)
 1705 N. 17th st., Philadelphia, Pa.
 Robertson, Felix O., (1890)
 Box 998, Portland, Ore.
 Robbins, Wilbur F., (1892)
 28 Main st., Littleton, N. H.
 ROBINSON, JAMES S., (1869)
 2d & Madison sts., Memphis, Tenn.
 Robinson, William J. M., (1902)
 119 E. 128th st., New York, N. Y.
 Rockefeller, Howard, (1900)
 24 West Park st., Butte, Mont.
 Rockefeller, Lucius, (1880)
 Palisade ave., Englewood, N. J.
 Rodemoyer, William E., (1901)
 4900 Second ave., Pittsburgh, Pa.
 Roe, J. Newton, (1902)
 College ave. & Locust sts., Valparaiso, Ind.
 Roehrig, Albert M., (1902)
 U.S.M. Hosp., Stapleton, Staten Island, N. Y.
 Roeller, Edward F., (1902)
 Velasco, Tex.

- Roesch, Anton, (1901) Sadtler, Samuel P., (1893)
1311 Michigan ave., Chicago, Ill. N. E. cor. 10th & Chestnut sts., Philad'a, Pa.
- Rogers, Anthony C., (1902) Sailer, Frank, (1904)
139 Prospect st., Gloucester, Mass. care Powers & Weightman, Philad'a, Pa.
- Rogers, Arthur H., (1882) Samson, Max, (1900)
Geneseo, Livingston Co., N. Y. 117 Camp st., New Orleans, La.
- Rogers, Edward, (1902) Sandbrohn, John A., (1904)
U. S. P. H. & M. H. Service, Cleveland, O. Manhattan Building, Des Moines, Ia.
- Rogers, William H., (1869) SANDER, ENNO, (1858)
North st., Middletown, N. Y. 2801-2811 Lawton ave., St. Louis, Mo.
- Rogg, Charles W., (1903) Sanford, John F., (1902)
511 Wal st., Des Moines, Ia. York Village, Me.
- Rollins, John F., (1859) Sauerhering, Edward, (1903)
7 Hamilton st., Dover, N. H. Mayville, Dodge Co., Wis.
- Rose, Edward S., (1904) SAUNDERS, WILLIAM, (1860)
Vinton, Ia. Central Experim. Farm, Ottawa, Can.
- Rose, Herman L., (1901) Sauvinet, Chas. D., (1902)
Columbia, Ill. 238 Villere st., New Orleans, La.
- Rosengarten, George D., (1902) Sawyer, Charles H., (1896)
1700 Fitzwater st., Philadelphia, Pa. 52 Main st., Saco, Me.
- Rosenthal, David A., (1894) Sawyer, Edward S., (1904)
Gay & Clinch sts., Knoxville, Tenn. 304 W. 134th st., New York, N. Y.
- Rosenzweig, Benj., (1898) Sawyer, William F., (1885)
644 Fulton st., Brooklyn, N. Y. 1152 Tremont st., Boston, Mass.
- Roth, Charles R., (1900) Sayre, Edward A., (1877)
333 E. Tuscarawas st., Canton, O. 100 Henry st., Orange, N. J.
- Rowell, Samuel J., (1903) Sayre, Lucius E., (1883)
Main st. & Broadway, Excelsior Spgs., Mo. University of Kansas, Lawrence, Kan.
- Rowlinski, Robert A., (1892) Scarboro, Turner A., (1903)
104 Broughton st., Savannah, Ga. R. R. st. S., Lyons, Ga.
- Rozieue, Robert P. M., (1904) Schadt, Conrad, (1903)
120 E. Washington st., Phoenix, Ariz. Amana, Ia.
- Ruddiman, Edsel A., (1894) Schaefer, Emil A., (1900)
Vanderbilt University, Nashville, Tenn. 1436 Fifth ave., Pittsburg, Pa.
- Ruenzel, Henry G., (1892) Schafer, George H., (1901)
753 3d st., Milwaukee, Wis. 713 Front st., Fort Madison, Ia.
- Ruhl, Harry F., (1902) Schaffer, Charles, (1903)
Manheim, Lancaster Co., Pa. Naval Hospital, Brooklyn, N. Y.
- RUMSEY, SAMUEL L., (1876) SCHEFFER, HENRY W., (1863)
Fort & Hotel sts., Honolulu, H. I. care of Larkin & Scheffer, St. Louis, Mo.
- RUNYON, EDWARD W., (1875) Schenk, Henry, (1903)
11 W. 42 st., New York, N. Y. 80 Washington Sq., New York, N. Y.
- Rupp, Harlan E., (1904) Scherer, Andrew, (1884)
901 14th st., Denver, Col. 383 N. State st., Chicago, Ill.
- Ruppert, John, (1880) Scherling, Gustav, (1884)
Price Hill, Cincinnati, O. 1201 4th st., Sioux City, Ia.
- Rusby, Henry H., (1890) Schieffelin, William J., (1891)
115 W. 68th st., New York, N. Y. 170 William st., New York, N. Y.
- Ryan, Frank G., (1892) Schiemann, Edward B., (1880)
151 Joseph Campau ave., Detroit, Mich. M. & Walnut sts., Louisville, Ky.
- Ryerson, Maurice W., (1903) Schimpf, Henry W., (1894)
3643 Charles st., Omaha, Neb. 443 W. 34th st., New York, N. Y.

- Schlabach, Edward J., (1904)
225 N. Market st., Canton, O.
- Schleussner, Chas. F., (1902)
198 Ninth ave., New York, N. Y.
- Schlosser, Peter, (1902)
124 W. Chestnut st., Louisville, Ky.
- Schlotterbeck, Augustus G., (1896)
36 Brown st., Portland, Me.
- Schlotterbeck, Julius O., (1888)
1319 Israel ave., Ann Arbor, Mich.
- Schlueter, Robert E., (1904)
909 Park ave., St. Louis, Mo.
- Schmid, Henry, (1887)
38 Ave. A., New York, N. Y.
- Schmidt, Charles, (1902)
2906 Parkwood ave., Baltimore, Md.
- Schmidt, Ferdinand T., (1886)
Ave. C & 15th st., Flatbush, Brooklyn, N. Y.
- Schmidt, Florian C., (1882)
7123 Cottage Grove ave., Chicago, Ill.
- Schmidt, Frederick M., (1887)
Room 1007, Schiller Building, Chicago, Ill.
- Schmidt, Henry, (1904)
501 Eighth ave., Elizabeth, N. J.
- Schmidt, Valentine, (1887)
Polk & Jackson sts., San Francisco, Cal.
- Schmidt, Walter, (1904)
803 N. Leavitt st., Chicago, Ill.
- Schmidt, Walter K., (1903)
84 Canal st., Grand Rapids, Mich.
- Schmitt, George J. F., (1890)
507 W. Commerce st., San Antonio, Tex.
- Schmitter, Jonathan, (1892)
Maple st., Gypsum City, Saline Co., Kan.
- Schnackenberg, Karl, (1904)
437 Amsterdam ave., New York, N. Y.
- Schneider, Albert, (1899)
Calif. Coll. Pharm., San Francisco, Cal.
- Schoenhut, Christie H., (1888)
199 Superior st., Cleveland, O.
- Schoenthaler, John P., (1901)
1800 Sidney st., St. Louis, Mo.
- Schoettlin, Albert J., (1882)
4th & Chestnut sts., Louisville, Ky.
- Schrader, August C., (1898)
Elliott & Curley sts., Baltimore, Md.
- Schrank, C. Henry, (1876)
437 E. Water st., Milwaukee, Wis.
- Schreiber, August, (1901)
8th & Humboldt sts., Tell City, Ind.
- Schreiner, Oswald, (1900)
Bureau Soils, Dept. Agriculture, Wash., D. C.
- Schrodt, Jacob, (1903)
106 S. Francis st., Terrell, Tex.
- Schueller, Frederick W., (1880)
232 S. High st., Columbus, O.
- Schuh, Paul G., (1894)
607 Commercial ave., Cairo, Ill.
- Schultz, John J., (1904)
528 Main st., Lafayette, Ind.
- Schulze, Louis, (1892)
631 S. Patterson Park ave., Baltimore, Md.
- Schumacher, Albert J., (1904)
499 W. Seventh st., St. Paul, Minn.
- Schumann, Otto G., (1902)
837 N. Caroline st., Baltimore, Md.
- Schutz, Chris, (1902)
Madison, S. Dak.
- Scott, George T., (1883)
Franklin Square, Worcester, Mass.
- Scott, Walter R., (1904)
N. Meridian st., Puyallup, Wash.
- Scott, William H., (1873)
1617 17th st., Richmond, Va.
- Scoville, Wilbur L., (1891)
50 Washington st., Boston, Mass.
- SEABURY, GEORGE J., (1876)
59 Maiden Lane, New York, N. Y.
- Searby, William M., (1882)
400 Sutter st., San Francisco, Cal.
- Searson, Edwin A., (1904)
Grand Island, Neb.
- Seaverns, Martha G. (Miss), (1902)
81 Concord ave., Cambridge, Mass.
- Seidel, John H., (1902)
Masonic Block, Biddeford, Me.
- Seinsoth, John J., (1900)
11 Main st., Hartford, Conn.
- Seitz, Lorenz A., (1901)
736 S. 4th st., St. Louis, Mo.
- Seltzer, Leonard A., (1899)
Room 6, 32 Adams ave. W., Detroit, Mich.
- Selzer, Eugene R., (1893)
1751 Superior st., Cleveland, O.
- Semple, Henry B., Jr., (1903)
233 Northampton st., Easton, Pa.
- Sennewald, Emil A., (1900)
800 Hickory st., St. Louis, Mo.
- Serodino, Herman, (1880)
5th & Walnut sts., Cincinnati, O.
- Settle, James A., (1903)
Yukon, Okla. Ter.
- Seymour, James, (1903)
Norman, Okla. Ter.

- Shafer, Erwin C., (1893) Green Lane & York Road, Philadelphia, Pa.
Sharp, Alpheus P., (1855) Pratt & Howard sts., Baltimore, Md.
 Sharp, Sol. A., (1902) 1845 Polk st., San Francisco, Cal.
 Sharples, Stephen P., (1875) 26 Broad St., Boston, Mass.
 SHEPPARD, SAMUEL A. D., (1865) 1129 Washington st., Boston, Mass.
 Sheridan, Wm. F., (1904) U. S. N. Hosp., Norfolk, Va.
 Sherman, Charles R., (1889) 102 S. 16th st., Omaha, Neb.
 Sherrard, Charles C., (1893) Angola, Ind.
 Sherriff, Wm. E. (1904) Douglas ave., Ellsworth, Kan.
 Sherwood, Henry J., (1894) 979 Woodland ave., Cleveland, O.
 Shimer, Samuel M., (1904) 135 W. Main st., Middletown, N. Y.
 SHINN, JAMES T., (1860) Broad & Spruce sts., Philadelphia, Pa.
 Shoemaker, Clayton F., (1902) 511 Arch st., Philadelphia, Pa.
 SHOEMAKER, RICHARD M., (1865) 4th & Race sts., Philadelphia, Pa.
 Shoults, Robert G., (1901) Napa, Cal.
 Shrader, William E., (1902) 132 Clinton st., Iowa City, Ia.
 Shreve, John A., (1880) Main st., Port Gibson, Miss.
 Shudrowitz, Frank S., (1904) Lansing, Kan.
 SHURTLEFF, ISRAEL H., (1875) 195 Fourth st., New Bedford, Mass.
 Siebe, Henri O., (1903) Hattiesburg, Perry co., Miss.
 Siegenthaler, Harvey N., (1882) 22 E. High st., Springfield, O.
 Sieker, Ferdinand A., (1893) 120 William st., New York, N. Y.
 Sieplein, Chas. A., (1904) 426 Rose Building, Cleveland, O.
 Sills, Fred. W., (1903) 1914 Evanston ave., Chicago, Ill.
 Simenstad, Martin O., (1903) Edmore, N. Dak.
 Simmons, Frank B., (1897) 182 Main st., Woonsocket, R. I.
 Simmons, Gustav T., (1903) Kathryn, N. Dak.
 SIMMS, GILES G. C., (1860) 1344 New York ave., Washington, D. C.
 Simon, William, (1885) 1348 Block st., Baltimore, Md.
 Simonson, Louis, (1904) 37 Cooper st., Boston, Mass.
 Simpson, William, (1873) 101 Fayetteville st., Raleigh, N. C.
 Sims, Henry U., (1903) Longview, Tex.
 Simson, Francis C., (1876) Pentagon Bldg., Halifax, N. S.
 SKELLY, JAMES J., (1866) 339 E. 14th st., New York, N. Y.
 Slade, Harry A., (1899) 10 State st., Montpelier, Vt.
 Slater, Frank H., (1882) P.O. Box 10, Matawan, Monmouth Co., N. J.
 Slaughter, Thos. O., (1904) Waynesboro, Miss.
 Sloss, Robert A., (1901) Pharmacist, Clinton Prison, Dannemora, N. Y.
 Small, Herbert E., (1901) 2494 Washington st., Boston, Mass.
 Smith, Albert H., (1902) 3428 Frankford ave., Philadelphia, Pa.
 Smith, Ben E., (1904) Sulphur Springs, Texas.
 Smith, B. Frank, (1892) 433 Market st., Harrisburg, Pa.
 Smith, Clarence P., (1890) 861 Broad st., Newark, N. J.
 Smith, Edward J., (1903) 158 Eddy st., San Francisco, Cal.
 Smith, Edward N., (1885) 93 Main st., Thompsonville, Conn.
 Smith, Edward W., (1902) 764 W. 4th st., Williamsport, Pa.
 Smith, Francis M., (1902) 158 Wentworth st., Charleston, S. C.
 Smith, Harley E., (1903) 8th & Main sts., Riverside, Cal.
 Smith, James A., (1902) care Mallinckrodt Chem. W'ks, St. Louis, Mo.
 Smith, J. Schall, (1903) 7 E. Market st., York, Pa.
 Smith, J. Stovall, (1903) 301 Newcastle st., Brunswick, Ga.
 Smith, Lauriston S., (1892) King st., St. Augustine, Fla.

Smith, Linville H., 701 Centre st., Jamaica Plain, Mass.	(1892)	Speer, Charles C., St. Augustine, St. John's Co., Fla.	(1902)
Smith, Oliver V. R., 3620 3d st., Des Moines, Ia.	(1903)	Speissegger, Walter L., 460 Meeting st., Charleston, S. C.	(1902)
SMITH, OTIS W., 5th & Engineer sts., Sedalia, Mo.	(1903)	Sprague, Wesson G., Main st., Flushing, Mich.	(1895)
Smith, Reuben R., 901 7th ave., New York, N. Y.	(1890)	Sprissler, Clara (Miss), 601 S. 9th st., Philadelphia, Pa.	(1902)
Smith, Theodric, 1343 Pennsylvania ave., Baltimore, Md.	(1890)	Squibb, Charles F., Bernardsville, N. J.	(1901)
Smith, Walter V., 2d & Green sts., Philadelphia, Pa.	(1902)	St. Jacques, Gaston, St. Hyacinthe, Que., Can.	(1900)
Smith, White G., Asheville, N. C.	(1892)	St. John, Sydney S., Lakota, N. Dak.	(1897)
Smith, Willard A., Main st., Richfield Springs, N. Y.	(1880)	STACEY, BENJAMIN F., Thompson Square, Charlestown, Mass.	(1860)
Smithson, David E., Emmett, Canyon Co., Idaho.	(1890)	Stacy, Marion F., 5 W. Sale st., Tuscola, Ill.	(1903)
Sniteman, Charles C., Neillsville, Clark Co., Wis.	(1881)	Staehle, Louis L., 169 S. Orange ave., Newark, N. J.	(1898)
Snodgrass, Latta K., 120 Main st., Little Rock, Ark.	(1901)	Stahl, Amanda W. (Miss), 22 Alaska st., Chicago, Ill.	(1903)
Snow, Charles W., 214 Warren st., Syracuse, N. Y.	(1876)	Stahlhuth, Ernest H. W., 5th & Washington sts., Columbus, Ind.	(1887)
Snow, Clyde M., 358 Dearborn st., Chicago, Ill.	(1903)	Stamford, William H., 256 Mulberry st., Newark, N. J.	(1876)
Snow, Fred. A., 600 Kansas ave., Topeka, Kan.	(1904)	Stamm, Dante M., Geneseo, Ill.	(1896)
<i>Snyder, Ambrose C.</i> , 13½ St. Felix st., Brooklyn, N. Y.	(1867)	Stange, Carl F., 1400 18th st., San Francisco, Cal.	(1897)
Snyder, Henry N., 146 N. Queen St., Lancaster, Pa.	(1904)	Staudt, Louis C., 15 S. Broadway, Aurora, Ill.	(1890)
Sohrbeck, G. Henry, 3d ave. & 16th st., Moline, Ill.	(1888)	Stearns, Frederick, 371 Lafayette ave., Detroit, Mich.	(1897)
Sohrbeck, George W., 1601 3d ave., Moline, Ill.	(1897)	Stearns, William L., 378 Washington st., New York, N. Y.	(1903)
Solomons, Isaiah A., 163 Congress st., Savannah, Ga.	(1894)	STEELE, JAMES G., 765 1st ave., San Francisco, Cal.	(1859)
Sombart, John E., Wilmore, Kan.	(1881)	Stein, Edward T. N., 217 Montgomery st., Jersey City, N. J.	(1902)
Sords, Thomas V., 315 Pearl st., Cleveland, O.	(1893)	Stein, Jacob H., 801 Penn st., Reading, Pa.	(1902)
Sorency, Robert, Warrensburg, Mo.	(1903)	Steinmeyer, William O., Carlinville, Ill.	(1901)
Southard, Frank A., Hygienic Lab'ory, P.H.&M.H.S., Wash., D.C.	(1903)	Stephenson, Charles W., U. S. M. Hospital, Chicago, Ill.	(1902)
Spalding, Warren A., 89 Church st., New Haven, Conn.	(1876)	Sterett, Walter B., care Cooper Drug Company, Joplin, Mo.	(1903)
Spangler, Lewis C., Savannah Quarantine, Savannah, Ga.	(1902)	Stern, August O., 2457 Superior st., Cleveland, O.	(1904)
Sparks, James M., 718 Garrison ave., Fort Smith, Ark.	(1894)	Stevens, Alviso B., 915 Oakland ave., Ann Arbor, Mich.	(1885)

- Stevens, Edward, (1903) Sweet, Caldwell, (1881)
901 Pennsylvania ave., Washington, D. C. 22 W. Market Square, Bangor, Me.
- Stevens, Frederick S., (1903) Symonds, Arthur H., (1892)
Auburn, Cal. Conneaut, Ashtabula Co., O.
- Stewart, Aaron W., (1902) Taber, Joseph M., (1901)
8th st. & University Place, New York, N. Y. Elko, Nev.
- Stewart, Francis E., (1884) Takamine, Jokichi, (1898)
Upper Montclair, N. J. 613 W. 142d st., New York, N. Y.
- Stewart, Harry E., (1903) Tallman, Lewis L., (1904)
639 W. Bay st., Jacksonville, Fla. 2d & Main sts., Walla Walla, Wash.
- Stier, Carl, (1902) Taylor, Augustus C., (1900)
Marine Hospital, Key West, Fla. 201 Maryland ave. N. E., Washington, D. C.
- Stierle, J. G., (1904) Taylor, George E., (1895)
5th & Jefferson sts., Dayton, O. 615 Harrison ave., Leadville, Colo.
- Stockton, Robert C., (1903) Teeters, Wilbur J., (1902)
Main & 2d sts., Richmond, Ky. Iowa Coll. Pharm., Iowa City, Ia.
- Stoddart, Thomas, (1900) Temm, William D., (1901)
84 Seneca st., Buffalo, N. Y. 1926 N. Grand ave., St. Louis, Mo.
- Stolle, Henry J., (1903) Terrill, Willis E., (1899)
4th & Market sts., St. Louis, Mo. 9 State st., Montpelier, Vt.
- Stone, Clarence G., (1901) Thames, Joseph J., (1895)
273 Rich ave., Mt. Vernon, N. Y. E. Main st., Taylor, Williamson Co., Tex.
- Stott, Samuel T., (1900) Thelander, Chreston C., (1902)
505 Penna. ave. N. W., Washington, D. C. 925 4th st., Sioux City, Ia.
- Stoughton, Dwight G., (1890) Thomas, Frank W., (1902)
204 State st., Hartford, Conn. West Main st., Webb City, Mo.
- Stowe, Ernest A., (1904) Thomas, Robert, Jr., (1888)
100 N. Prospect st., Grand Rapids, Mich. 108 Broad st., Thomasville, Ga.
- Stowell, Daniel, (1875) Thomasson, Anders, (1892)
1045 Washington st., Boston, Mass. 277 Central st., Lowell, Mass.
- Streett, Edmund O., (1898) Thompson, Albert D., (1895)
1401 N. Charles st., Baltimore, Md. 1st ave. S. and 3rd st., Minneapolis, Minn.
- Stroup, Freeman P., (1900) Thompson, Edwin T., (1902)
145 N. 10th st., Philadelphia, Pa. 911 W. 7th st., Sioux City, Ia.
- Stuart, Wm. A., (1898) Thompson, Joseph, (1902)
800 W. Baltimore st., Baltimore, Md. 401 W. 7th st., Sioux City, Ia.
- Sturmer, Julius W., (1901) *Thompson, William B.*, (1858)
323 Salisbury st., Lafayette, Ind. 4804 Trinity Place, W. Philadelphia, Pa.
- Stutzlen, Frank C., (1902) Thorburn, Albert D., (1902)
231 3d st., Elizabeth, N. J. 55 Walnut st., Chicago, Ill.
- Sultan, Frederick W., (1901) Thorn, Henry P., (1879)
4521 Forest Park Boulevard, St. Louis, Mo. Main st., Medford, N. J.
- Sum, Francis, (1904) Thurston, Azor, (1886)
2840 Clark ave., St. Louis, Mo. Grand Rapids, Wood Co., O.
- Suppan, Leo R. A., (1904) Thurston, Edwin J., (1904)
2648 Russell ave., St. Louis, Mo. Gulf Quarantine, via Biloxi, Miss.
- Swain, Harry, (1902) Tidball, James T., (1902)
13th & Lombard sts., Philadelphia, Pa. Main st., Brookings, S. Dak.
- Swann, Samuel V. B., (1903) Tielke, Maxwell G., (1904)
918 Sixth ave., New York, N. Y. 474 Detroit st., Cleveland, O.
- Swannell, Henry, (1902) Tigner, James O., (1890)
1 Main st., Champaign, Ill. Greenville, Meriwether Co., Ga.

Tilden, Amos K., 7 Bulfinch st., Boston, Mass.	(1892)	Van Winkle, Abraham, 35 Clinton ave., Newark, N. J.	(1871)
Timberlake, Arthur, College ave. & 16th st., Indianapolis, Ind.	(1902)	Vanderkleed, Charles E., 5251 Jefferson st., Philadelphia, Pa.	(1902)
Timmer, Jacob B., 181 Lake ave., Grand Rapids, Mich.	(1904)	Vargas, Jorge, 809 Beacon st., Boston, Mass.	(1891)
Tobin, John M., Narragansett Pier, R. I.	(1887)	Varney, Edward F., 39 Tremont st., Boston, Mass.	(1892)
Todd, Albert M., 204 N. Rose st., Kalamazoo, Mich.	(1885)	Vaughan, Parry W., 106 E. Main st., Durham, Orange Co., N. C.	(1882)
Tontz, George W., 2248 Dodier st., St. Louis, Mo.	(1901)	Vernor, James, 33 Woodward ave., Detroit, Mich.	(1866)
Topping, Arthur E., Overbrook, Kan.	(1904)	Viallon, Paul L., Jr., White Castle, La.	(1902)
Torbert, Willard H., 756 Main st., Dubuque, Ia.	(1887)	Vincent, Fred. A. C., Room 5, Ricksecker Bldg., Kansas City, Mo.	(1904)
Tsaylor, Charles F., 159 Main st., Biddeford, Me.	(1902)	Vitt, Rudolph S., 3860 S. Broadway st., St. Louis, Mo.	(1895)
Treat, Joseph A., Stuart, Guthrie Co., Ia.	(1885)	Vockroth, Emil, 55 Newark ave., Jersey City, N. J.	(1893)
Trolinger, Ernest F., Bell Buckle, Tenn.	(1903)	Voigt, Joseph F., 840 Market st., Chattanooga, Tenn.	(1893)
Troxel, Henry L., 1045 N. Fulton ave., Baltimore, Md.	(1902)	VOISS, ARCADIVS, 395 Wells st., Chicago, Ill.	(1901)
Troxler, Constantine, Jr., 228 W. Breckenridge st., Louisville, Ky.	(1896)	Von Stein, John H., Upper Sandusky, O.	(1904)
Troxler, Robert F., Quarantine Sta., Port Townsend, Wash.	(1902)	VORDICK, AUGUST H., Jefferson ave. & Benton st., St. Louis, Mo.	(1874)
Truax, Charles, 42 Wabash ave., Chicago, Ill.	(1882)	Voss, Edward, Jr., 1201 Vine st., Cincinnati, O.	(1904)
True, Rodney H., 224 12th st. S. W., Washington, D. C.	(1904)	Voss, Geo. W., 680 Woodland ave., Cleveland, O.	(1885)
Truedson, Eric P., Puyallup, Wash.	(1904)	Votteler, William, Shelby & Oak sts., Louisville, Ky.	(1895)
Tucker, Greenleaf R., City Hospital, Boston, Mass.	(1890)	Waddell, Minor T., 1207 Ash st., Indianapolis, Ind.	(1899)
Turner, Adam, Orangeville, Ont., Can.	(1902)	Walbrach, Arthur, 1200 15th st., Denver, Colo.	(1881)
Turnquist, Carl M., 2458 Wentworth ave., Chicago, Ill.	(1901)	Walbridge, Cyrus P., 620 Washington ave., St. Louis, Mo.	(1901)
Tuthill, Frederick P., 526 Putnam ave., Brooklyn, N. Y.	(1899)	Waldner, Paul J., Naval Hospital, Brooklyn, N. Y.	(1900)
Uhlich, Ferdinand G., 2001 Salisbury st., St. Louis, Mo.	(1881)	Walker, Alfred L., 424 Woodward ave., Detroit, Mich.	(1903)
Ulch, James J., 623 E. Scott st., Des Moines, Ia.	(1903)	Walker, Chas. H., 115 South G st., Tacoma, Wash.	(1904)
Vadboncoeur, Louis J. E., 1 St. Lawrence st., Montreal, Can.	(1903)	Walker, E. Edward, Snow Hill, N. C.	(1900)
Van Derveer, Robert H., Broad & Monmouth sts., Red Bank, N. J.	(1897)	Wall, Otto A., 4532 Virginia ave., St. Louis, Mo.	(1884)
Van Ness, Geo. I., U. S. M. Hosp., Evansville, Ind.	(1904)	Wall, Otto A., Jr., 4532 Virginia ave., St. Louis, Mo.	(1903)

- Walling, Rufus O., (1903)
Lock Box 322, Keyport, N. J.
- Walsdorf, Chas. A., (1904)
Carrollton ave. & Oak st., New Orleans, La.
- Walsdorf, Edw. H., (1904)
Peters ave. & Magazine st., New Orleans, La.
- Walter, Charles A., (1899)
129 W. Georgia st., Indianapolis, Ind.
- Walton, Lucius L., (1904)
50 W. Fourth st., Williamsport, Pa.
- Wangler, Conrad D., (1876)
227 E. 4th st., Waterloo, Ia.
- Wanous, Josie A. (Miss), (1897)
521 Nicollet ave., Minneapolis, Minn.
- Ward, A. Jae, (1893)
107 E. Pike's Peak ave., Colorado Spr'gs, Colo.
- Ward, Charles A., (1891)
P. O. Box 460, Stoneham, Mass.
- Ward, Chas. E., (1904)
790 Broadway, Denver, Colo.
- Ward, Homer B., (1901)
Rowland, N. C.
- Ware, Charles H., (1898)
1930 Madison ave., Baltimore, Md.
- Warn, William E., (1886)
Lock Box 342, Keyport, N. J.
- Warner, Francis D., (1904)
137 E. Michigan st., New Carlisle, Ind.
- Warner, William R., Jr., (1902)
639 N. Broad st., Philadelphia, Pa.
- Watson, Herbert K., (1888)
803 Market st., Wilmington, Del.
- Watson, Joseph R., (1904)
1641 20th ave., Seattle, Wash.
- Watson, Sidney P., (1887)
137 Richardson st., Atlanta, Ga.
- Watson, William, Jr., (1902)
202 Genesee st., Utica, N. Y.
- Watt, George H., (1896)
Pullman, Wash.
- WAUGH, GEORGE J., (1862)
Ontario st., Stratford, Ont., Can.
- Weaver, Francis M., (1900)
111 Main st., Oklahoma City, Okla. Ter.
- Webber, Arthur H., (1903)
Cadillac, Mich.
- Webber, J. Le Roy, (1886)
277 Greene ave., Brooklyn, N. Y.
- Weber, Peter J., (1901)
320 S. 7th st., St. Louis, Mo.
- WEIDEMANN, CHARLES A., (1868)
2148 Green st., Philadelphia, Pa.
- Weidemann, George B., (1902)
2148 Green st., Philadelphia, Pa.
- Weilbaecher, Frank E., (1904)
6056 Hurst st, New Orleans, La.
- Weinstein, Abraham, (1904)
401 E. 57th st., New York, N. Y.
- Weiser, Wm. A., (1904)
127 E. Jefferson st., South Bend, Ind.
- Weiser, William P., (1902)
501 Market st., Camden, N. J.
- Weiss, Conrad H., (1900)
25 Monroe st., Anacostia, D. C.
- WELLCOME, HENRY S., (1875)
Snow Hill Buildings, London, E. C., Eng.
- Weller, Frank P., (1900)
755 8th st. S. E., Washington, D. C.
- Wells, Edwin H., (1893)
172 Milk st., Boston, Mass.
- Wendel, H. Edward, (1873)
3d & George st., Philadelphia, Pa.
- Wendt, William C., (1901)
366 S. 4th st., Columbus, O.
- Wenzell, William T., (1870)
1998 Ocean Bl'vd, San Francisco, Cal.
- Werner, Rudolf C., (1882)
2592 Atlantic ave., Brooklyn, N. Y.
- Weschcke, Chas., (1904)
Springfield, Minn.
- Wescott, William C., (1896)
Pacific & Delaware aves., Atlantic City, N. J.
- Wesner, Henry C., (1901)
Windsor, Henry Co., Mo.
- West, Charles A., (1892)
14 Fulton st., Boston, Mass.
- West, Courtney H., (1902)
620 N. 4th st., St. Louis, Mo.
- Westcott, James W., (1890)
423 N. Charles st., Baltimore, Md.
- Wetterstroem, Albert, (1888)
2867 Colerain ave., Cincinnati, O.
- Wetterstroem, Theodore D., (1897)
3935 Spring Grove ave., Cincinnati, O.
- Wheeler, William D., (1892)
21 Massachusetts ave., Boston, Mass.
- WHELFLEY, HENRY M., (1887)
2342 Albion Place, St. Louis, Mo.
- Whipple, George H., (1902)
Broad & Fayette sts., Bridgeton, N. J.
- Whitcomb, Frederick E., (1888)
Washington & Garrison aves., St. Louis, Mo.
- White, Charles H., (1902)
153 E. 51st st., New York, N. Y.

- White, Herbert E., (1897)
Jamestown, N. Dak.
- White, Howell Cobb, (1903)
119-123 Jackson st., Hawkinsville, Ga.
- White, Wm. R., (1904)
207 Foster st., Nashville, Tenn.
- Whitehead, Eugene T., (1900)
Main st., Scotland Neck, N. C.
- WHITFIELD, THOMAS, (1865)
240 Wabash ave., Chicago, Ill.
- Whitney, David V., (1903)
3722 E. 12th st., Kansas City, Mo.
- Whitney, Edgar F., (1897)
Warren, Minn.
- Wichelns, Frederick, (1881)
205 Greenwich st., New York, N. Y.
- Wickham, William H., (1870)
91 Fulton st., New York, N. Y.
- Wicks, Jesse H., (1903)
Havre, Mont.
- Wiegand, Thomas S., (1857)*
145 N. 10th st., Philadelphia, Pa.
- Wiegel, Carl G., (1904)
1806 Carson st., Pittsburg, Pa.
- Wikle, Jesse L., (1898)
1010 Noble st., Anniston, Ala.
- WILBERT, MARTIN L., (1902)
2811 Diamond st., Philadelphia, Pa.
- Wilbur, Lot, (1896)
Ave. C & 1st st., Snohomish, Wash.
- Wilcox, Levi, (1903)
22 Mitchell ave., Waterbury, Conn.
- Wiley, Harvey W., (1902)
Dept. of Agriculture, Washington, D. C.
- Willard, Rowland, (1902)
131 E. Main st., Haddonfield, N. J.
- Willenbrink, Chas. A., (1904)
512 Pike st., Covington, Ky.
- Williams, George G., (1888)
P. O. Box 3551, Boston, Mass.
- Williams, John K., (1875)
391 Main st., Hartford, Conn.
- Williams, Morrison P., (1902)
Trade & Tryon sts., Charlotte, N. C.
- Williams, Richard W., (1883)
Notre Dame st., Three Rivers, Que., Can.
- Williams, Seward W., (1887)
8 Brighton ave., East Orange, N. J.
- Williamson, Lee, (1898)
330 W. Baltimore st., Baltimore, Md.
- Willis, Henry, (1897)
4 St. John st., Quebec, Can.
- Willman, Wm. G., (1904)
Adams st., Brownsville, Texas.
- WILSON, BENJAMIN O., (1859)
46 Canal st., Boston, Mass.
- Wilson, Elmer L., (1903)
St. Paul, Neb.
- WINKELMANN, JOHN H., (1864)
824 N. Carrollton ave., Baltimore, Md.
- Winter, Jas. H., (1904)
1397 Valencia st., San Francisco, Cal.
- WINTER, JONAS, (1863)
202 Prospect st., Hagerstown, Md.
- Wirth, Adam, (1904)
618 St. Charles st., New Orleans, La.
- Wirthman, J. George, (1903)
1535 Grand ave., Kansas City, Mo.
- Wirthman, Joseph C., (1903)
18th st. & Troost ave., Kansas City, Mo.
- Wisdom, Hugh, (1901)
426 State st., Chicago, Ill.
- Wittich, Matthew H., (1897)
1519 E. Franklin ave., Minneapolis, Minn.
- Witting, Frederick F., (1902)
2559 Humboldt st., Denver, Colo.
- Wittmer, Joseph W., Jr., (1896)
1347 Clay st., Dubuque, Ia.
- Wolcott, A. Lincoln, (1903)
514 Arch st., Philadelphia, Pa.
- Wolcott, Frank E., (1902)
722 W. New York st., Indianapolis, Ind.
- Wolf, Henry A., (1901)
2133 S. 3d st., St. Louis, Mo.
- Wolff, Edward H., (1901)
522 Washington ave., St. Louis, Mo.
- Wolff, Gustave, (1903)
321 10th ave., New York, N. Y.
- WOLTERSDORF, LOUIS, (1865)
171 Blue Island ave., Chicago, Ill.
- Wood, Alonzo F., Jr., (1890)
2 Church st., New Haven, Conn.
- Wood, Edward S., (1879)
688 Boylston st., Boston, Mass.
- Wood, James P., (1890)
2 Church st., New Haven, Conn.
- Wood, John W., (1897)
494 Broadway, Newport, R. I.
- Woodman, Walter I., (1893)
St. Augustine, Fla.
- Woodruff, Roderick S., (1876)*
92 Prospect st., Waterbury, Conn.
- Woods, Charles H. A., (1897)
U. S. Marine Hospital, Chicago, Ill.

Woodworth, Charles B., 254 W. Wayne st., Fort Wayne, Ind.	(1900)	Zabaldano, Alexander, 1124 Stockton st., San Francisco, Cal.	(1902)
Woolsey, Jesse F., care Eli Lilly & Co., Indianapolis, Ind.	(1903)	Zemp, William R., P. O. Box 256, Camden, S. C.	(1900)
Wooten, Thomas V., 79 Dearborn st., Chicago, Ill.	(1893)	ZIEGLER, PHILIP M., 526 Penn st., Reading, Pa.	(1867)
Wrensch, Henry E., Jr., 610 Bloomfield ave., Montclair, N. J.	(1902)	Zimmerman, Albert, 2113 S. Adams st., Peoria, Ill.	(1863)
Wright, Charles L., Allen & Dougherty sts., Webb City, Mo.	(1901)	Zinn, Charles E., 501 Independence ave., Kansas City, Mo.	(1903)
Wuensch, Charles, 494 Springfield ave., Newark, N. J.	(1898)	ZOELLER, EDWARD V., Main st., Tarboro, N. C.	(1878)
Wulling, Frederick J., Minn. University, Minneapolis, Minn.	(1893)	Zorn, Emil, 12th & Elm sts., Cincinnati, O.	(1904)
Wunderlich, Edward, 1415 Dryades st., New Orleans, La.	(1891)	Zottman, William H., 1 Church st., Burlington, Vt.	(1903)
Wurmb, Theodore H., 1923 E. Grand ave., St. Louis, Mo.	(1890)	Zuenkeler, J. Ferd., 1902 Vine st., Cincinnati, O.	(1887)
YORSTON, MATTHEW M., 1063 Central ave., Cincinnati, O.	(1864)	Zwick, Albert O., 19 W. 7th st., Cincinnati, O.	(1904)
Young, Charles, 205 Franklin st., Johnstown, Pa.	(1902)	Zwick, Karl G., 1102 Madison ave., Covington, Ky.	(1899)

LIST OF MEMBERS WHO HAVE RESIGNED SINCE PUBLICATION OF LAST REPORT.

	Elected.
Barbat, Josephine E., San Francisco, Cal.,	1900
Bolink, Elebertus, Seattle, Wash.,	1902
Bond, John B., Jr., Little Rock, Ark.,	1902
Brown, Adin N., Missouri Valley, Ia.,	1903
Carslake, George M., Bordentown, N. J.,	1886
Chesnutt, Jas. H., Hot Springs, Ark.,	1901
Davison, Chas. C., Jr., Columbus, Ga.,	1903
Doty, Wirt P., Detroit, Mich.,	1900
Douglas, John N., Olyphant, Pa.,	1903
Eads, Robert I., Indianapolis, Ind.,	1895
Edelen, Chas. A., Louisville, Ky.,	1901
Elbrecht, Oscar H., St. Louis, Mo.,	1901
Field, Wm. C., Washington, D. C.,	1898
Fishman, Casriel, St. Louis, Mo.,	1903
Fouch, Wm. M., Baltimore, Md.,	1898
Gleim, John C., Cleveland, O.,	1893
Grambois, Augustin, New Orleans, La.,	1891
Grant, Isaac, San Francisco, Cal.,	1902
Harvey, Wade, Kosciusko, Miss.,	1903
Hinton, Rufus G., St. Louis, Mo.,	1901
Huston, Chas., Columbus, O.,	1872
Keeney, Caleb R., Philadelphia, Pa.,	1868
King, Campbell T., Macon, Ga.,	1897
Kolb, Wm. W., Savannah Q. Sta., Ga.,	1897
Lyons, Isaac L., New Orleans, La.,	1875
Miller, Herman, New York, N. Y.,	1897
Minnick, Wm. G., Allegheny, Pa.,	1902

Mitchell, Francis D.,	Kansas City, Mo.,	1903
Nordmann, Hermann,	Baltimore, Md.,	1895
Pippert, Nicholas J.,	St. Louis, Mo.,	1902
Quandt, Arthur A.,	Baltimore, Md.,	1894
Quandt, Ernest E.,	Baltimore, Md.,	1894
Reynolds, John J.,	Flemingsburg, Ky.,	1876
Rhodes, Chas. O.,	Groton, N. Y.,	1895
Rose, Herman L.,	Columbia, Ill.,	1901
Sauerhering, R. A.,	Mayville, Wis.,	1884
Schmidt, Joseph H.,	Omaha, Neb.,	1897
Squibb, Edw. H.,	Brooklyn, N. Y.,	1882
Stille, Adolph H.,	St. Louis, Mo.,	1901
Stone, Sarah E.,	Jones City, Okla. Ter.,	1903
Stormes, John E.,	Lancaster, Ky.,	1902
Thomas, Daniel J.,	Scranton, Pa.,	1900
Walker, John P.,	Freehold, N. J.,	1881
Weakley, Wm. S.,	York, Pa.,	1902

LIST OF MEMBERS WHO HAVE DIED SINCE PUBLICATION OF LAST
REPORT.

		Elected.
Averill, William H.,	Frankfort, Ky.,	1874
Brown, William T.,	Madison, N. J.,	1894
<i>Dearborn, George I.,</i>	New Market, N. H.,	1853
Dennin, Chas.,	Brooklyn, N. Y.,	1875
Greve, Chas. M.,	Chattanooga, Tenn.,	1887
Hechler, George L.,	Cleveland, O.,	1882
Hoffmann, Frederick,	Berlin, Germany,	1867
Huhn, George,	Minneapolis, Minn.,	1884
<i>Jenks, William J.,</i>	Philadelphia, Pa.,	1858
Kienth, Hans,	Milwaukee, Wis.,	1884
May, James O.,	Nagatuck, Conn.,	1875
MOORE, GEORGE,	Somersworth, N. H.,	1859
PRESCOTT, ALBERT B.,	Ann Arbor, Mich.,	1871
Renshaw, Thos. W.,	Lansford, Pa.,	1901
SARGENT, EZEKIEL H.,	Chicago, Ill.,	1864
Smith, George W.,	St. Louis, Mo.,	1901
Topley, James,	Vallejo, Cal.,	1869
Walker, William J.,	Albany, N. Y.,	1880
Webb, William H.,	Philadelphia, Pa.,	1867

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-PAYMENT OF
DUES, ACCORDING TO ARTICLE III, CHAPTER VII, OF THE BY-LAWS.

(PUBLISHED IN ACCORDANCE WITH A GENERAL RULE ADOPTED AT MONTREAL, CANADA,
AUGUST, 1896. SEE PAGE 17, VOLUME 44, PROCEEDINGS.)

		Elected.
Bamford, Melvin W.,	Philadelphia, Pa.,	1901
Barth, Henry H.,	Lincoln, Neb.,	1901
Berryman, William E.,	St. Louis, Mo.,	1901
Bowen, Cyrus W.,	Plattsburg, Mo.,	1901
Bowen, William A.,	Mombasa, British East Africa,	1897
Bruck, Philip H.,	Columbus, Ohio,	1884
Campbell, George D.,	Lonaconing, Md.,	1900
Carpenter, Alfred B.,	Greensville, S. C.,	1898

Case, Edmund W.,	Picton, Ontario, Can.,	1901
Caspari, William, Jr.,	Baltimore, Md.,	1898
Craig, William P.,	Residence unknown,	1901
Crane, Frank T.,	Machias, Me.,	1894
Dimock, Robert H.,	New Haven, Conn.,	1889
Donaghue, James,	Girardville, Pa.,	1900
Donaghue, Theresa V.,	Girardville, Pa.,	1900
Dorr, George W.,	Waterville, Me.,	1896
Dunham, Andrew A.,	Northfield, Vt.,	1901
Dunwody, Richard G.,	Atlanta, Ga.,	1861
Eilbracht, William E.,	Waterloo, Ill.,	1901
Friedewald, Hermann W.,	St. Louis, Mo.,	1901
Funsch, Oliver J.,	St. Louis, Mo.,	1901
Gale, Walter H.,	Chicago, Ill.,	1901
Gilchrist, Nellis R.,	Wakonda, S. Dak.,	1901
Gray, Henry R.,	Montreal, Can.,	1867
Green, Samuel L.,	Camden, Ark.,	1901
Hagenow, Theodore F.,	St. Louis, Mo.,	1901
Hall, Mary S.,	Chicago, Ill.,	1901
Hansen, Hans,	Residence unknown,	1901
Hayes, James H.,	East Boston, Mass.,	1892
Heinrich, Max P.,	St. Louis, Mo.,	1901
Heller, Charles T.,	St. Paul, Minn.,	1895
Hinrichs, Carl G.,	St. Louis, Mo.,	1901
Hirseman, Felix,	New York, N. Y.,	1900
Jackson, William J.,	San Francisco, Cal.,	1900
Kerna, William B.,	Bunceton, Mo.,	1901
Krause, John,	Cleveland, O.,	1900
Layton, Thomas,	St. Louis, Mo.,	1892
Methudy, Joseph P.,	St. Louis, Mo.,	1901
Moore, Josh. F.,	Meridian, Miss.,	1891
Nachtwey, Frank J.,	Dubuque, Ia.,	1901
Naylor, William W.,	Holton, Kansas,	1901
Otto, John N. W.,	New Orleans, La.,	1891
Parsons, Charles W.,	New York, N. Y.,	1899
Patrick, Elmer A.,	Sharpsburg, Pa.,	1900
Pattison, Geo. H.,	Chicago, Ill.,	1893
Pearman, William E.,	San Francisco, Cal.,	1898
Perkins, George H.,	North Andover Depot, Mass.,	1901
Pfeffer, William J.,	St. Louis, Mo.,	1901
Pilkington, William B.,	St. Louis, Mo.,	1901
Post, Arthur E.,	Brooklyn, N. Y.,	1901
Prutzman, Charles O.,	Muncie, Ind.,	1901
Richardson, Thomas L.,	Baltimore, Md.,	1895
Roberts, James F.,	Parkhill, Ontario, Can.,	1901
Semphill, Walter M.,	Chicago, Ill.,	1892
Shwab, George A.,	Nashville, Tenn.,	1901
Simonson, William,	Cincinnati, O.,	1887
Smallwood, W. Thornton,	Chicago, Ill.,	1901
Sperry, Herman J.,	New Haven, Conn.,	1880
Spilker, Hermann F. A.,	St. Louis, Mo.,	1901
Stegner, Emil,	St. Louis, Mo.,	1901
Thweatt, Archibald,	Humboldt, Tenn.,	1900
Zimmerman, Bernard,	St. Paul, Minn.,	1895

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